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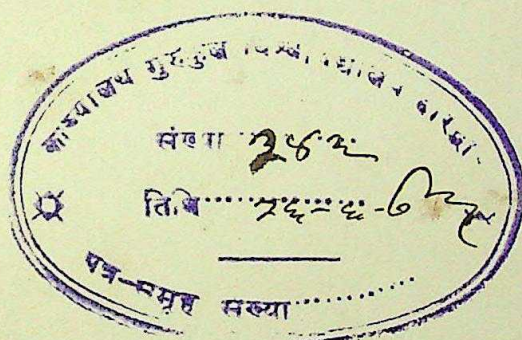
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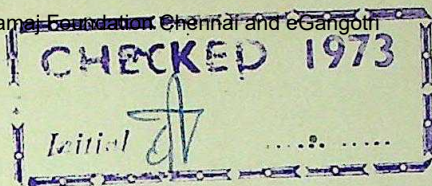




*H. G. Norwood*

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# JOURNAL OF THE Bombay Natural History Society.

MARCH 1914.

VOL. XXII.

No. 4.

THE GAME BIRDS OF INDIA, BURMA AND CEYLON.

BY



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CORRECTION.

THE GAME BIRDS OF INDIA, BURMA AND CEYLON.

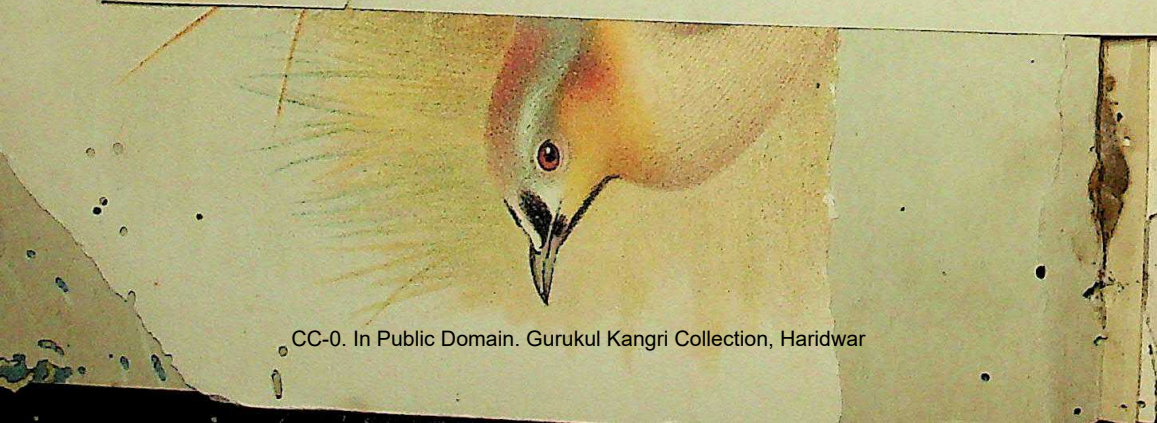
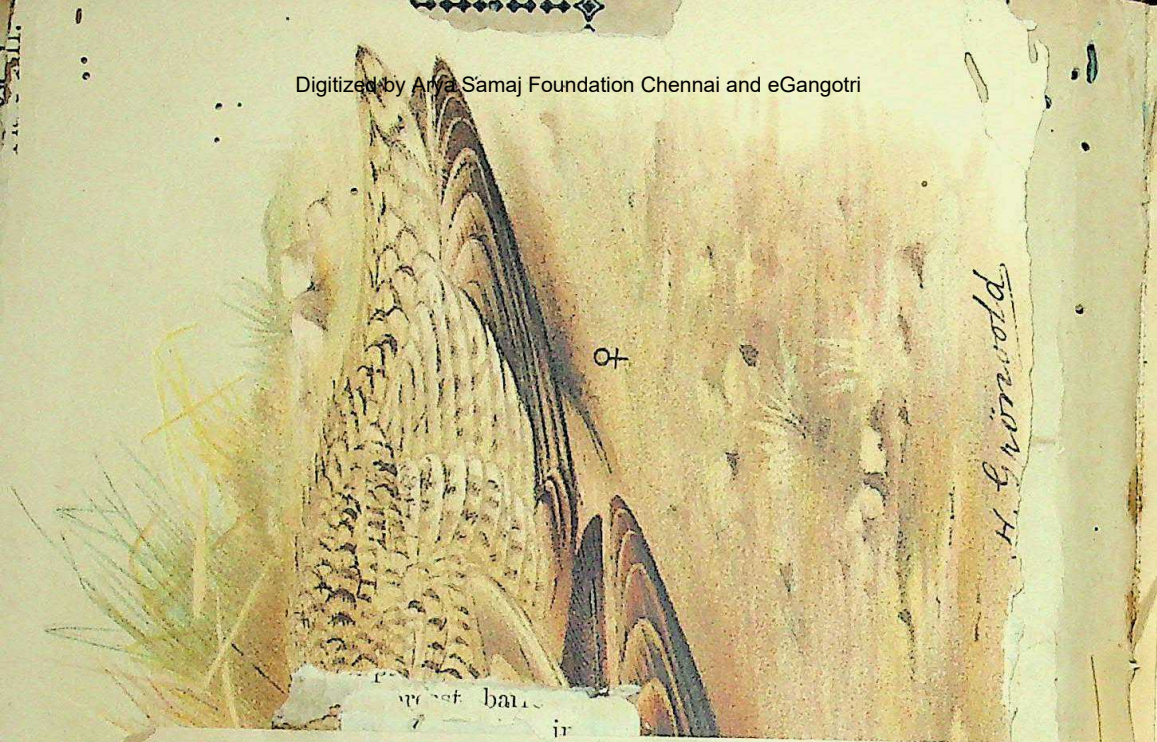
The letterpress published in the last number, p. 427, Part XI, of this series, should have been that of the Closed-barred Sand Grouse (*Pterocles lichtensteini*) but in mistake the letterpress of the Coronetted Sand Grouse (*Pterocles coronatus atratus*) was published with the plate of *Pterocles lichtensteini*.

Eds.

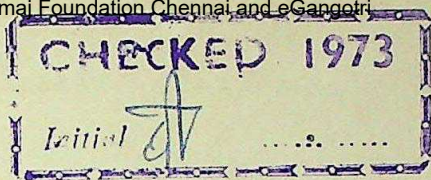
*Vernacular names.*—None recorded.

*Adult male.*—The forehead with three bars of black and white as in *fasciatus*, but the front white bar runs up and back into the black, and the black in the same way into the posterior white band, so that the two front bands are more or less V shaped, whilst the third band is generally interrupted in the middle; this is also produced backwards as a broad, short supercilium, with a black eyebrow patch in the centre. The blackish band is also









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BY

male in f

E. C. STUART BAKER, F.L.S., F.Z.S., M.B.O.U.

PART XII.

*With Plate XII.*

*(Continued from page 433 of Volume XXII.)*

PTEROCLES LICHTENSTEINI.

*The Close-barred Sand-Grouse.*

*Pterocles lichtensteini*.—Temm., Pl. Col. Vol. v., pls. 25, 26, (1825); Blyth, J. As. Soc. Beng. xxiv, p. 304; Hume, Str. Feath. i, p. 219; Wise, *ibid*, iv, p. 230; Hume, *ibid*, vii, p. 162; *id*. Cat. No. 800 bis; Hume and Marshall, Game-B. i, p. 66; Butler, Cat. B. of Sind, etc., p. 52; Tufnell, Str. Feath. ix, p. 202; Barnes, B. of Bombay, p. 296; Newnham, Jour. B. N. H. Soc. iv, p. 53; Laurie, *ibid*, p. 94; Ogilvie-Grant, Cat. B. M. xxii, p. 29; Oates, Game-B. Ind. i, p. 51; Ogilvie-Grant, Game Birds i, p. 20; Le Mess, Game B, p. 57. Blanford, Fauna India, iv, p. 57.

*Pterocles lichensteini*.—Sharpe, Hand-list I, p. 51.

*Vernacular names*.—None recorded.

*Adult male*.—The forehead with three bars of black and white as in *fasciatus*, but the front white bar runs up and back into the black, and the black in the same way into the posterior white band, so that the two front bands are more or less V shaped, whilst the third band is generally interrupted in the middle; this is also produced backwards as a broad, short supercilium, with a black eyebrow patch in the centre. The blackish band is also



often extended from its posterior base as a fine line under the eye and over the ear-coverts. Rest of the head and neck isabelline buff, each feather with a black central mark, long and forming streaks above, but reduced to spots below; the chin and centre of the throat often immaculate in old birds and, in colour here, a purer buff. Remainder of upper parts very pale buff closely barred with wavy black lines, the upper tail coverts more boldly barred and ochreous buff at the tips; tail feathers barred buff and black, the bars broadening towards the ends which are again widely tipped a richer buff. Scapulars and inner secondaries like the back but more boldly barred and with ochreous-yellow tips; lesser coverts like the back; secondary and median coverts pale clear buff, in some cases almost white, barred with black and tipped yellow: bastard wing, primary coverts and primaries brown, edged paler. Under aspect of the wings and axillaries pale grey. Upper coverts buff and black; lower breast a rather rich yellow buff, the centre by a band varying from a chocolate chestnut to black and followed again by another black band, generally much broken and mixed with white. Abdomen, vent and external flanks white, each feather with two half moon-shaped bars, the terminal being black and the lower, concealed one, chocolate; under tail coverts pale buff with arrow shaped bars of black or deep chocolate; feathers of tarsi white to pale buff.

The above description gives most of the details in variation of colour but it must be noted that the bird varies in general tone of colouration from a pale sandy-buff to a richer, almost chestnut, buff, more, especially on the scapulars and upper back.

The bird from which the plate is taken is a very typical Indian specimen but in a good many the upper parts are slightly richer in colour.

The colour of the breast also varies somewhat and in a few birds the part above the central band is slightly suffused with vinous but I have never seen the upper and lower parts contrasting with one another as is often, generally in fact, the case with *fasciatus*.

*Measurements*.—Wing 6.85" (171mm.) to 7.35" (186.6mm.) with an average of 7.06" (179.3mm.), tarsus .91" (23.1mm.) to 1.10" (27.9mm.), the average being exactly 1.0" (25.4mm.); bill from tip along culmen to feathers of forehead .46" (11.6mm.) to .52" (13.2mm.) and averaging .49" (12.4mm.) full; tail from vent about .3" (7.6mm.) or a little over.

"Total length 10.3 inches; wing 7; tail 2.8; tarsus 1.1". (Ogilvie-Grant.)

"Legs wholly feathered in front; feet orange yellow; reticulations white; claws dusky, tipped yellowish; bill fleshy brown, darker in the female; irides brown; orbital skin yellow." (Hume.)



## THE GAME BIRDS OF INDIA, BURMA AND CEYLON. 655

"Iris brown, orbit lemon yellow, bill orange-brown, feet orange yellow." (Blanford.) "Feet chrome yellow." (Sharpe.)

*Adult female.*—The female has the whole head and neck pale earthy buff spotted with black, these spots becoming streaks on the upper part, very fine lines on the lores and ear coverts and fairly isolated spots below. The whole of the upper parts and wing coverts are finely barred pale earthy buff and black, the median and greater coverts tipped narrowly with pale yellowish and the outer webs of the outer coverts with narrower black bars and more, proportionate, pale buff, generally of a lighter, purer tint than that of the back. Greater coverts and primaries like those of the male; under wing coverts grey, obsoletely barred darker; whole lower surface and flanks barred black and white, the latter purest on the abdomen and buff on the breast; on the under tail coverts the bars are broader and the tips are yellowish; feathers of tarsi pale buff.

The female varies to the same extent as the male in general tint; the bird shewn in the plate representing an average bird whilst some may range a good deal paler and sandier and others richer with more of a rufous tint.

The wing of the female measures between 6.55" (166.3 mm.) and 7.10" (180.3 mm.) with an average of 6.85" (176.5 mm.); the tarsus between .86" (21.8 mm.) and 1.0" (25.4 mm.) with an average of .93" (23.6 mm.); the bill between .50" (12.7 mm.) and .55" (13.9 mm.) with an average of .52" (13.2 mm.); tail about .3" (7.6 mm.) or rather less.

It is on an average, therefore, a decidedly smaller bird than the male but, judging from the small series I have been able to examine, the bill is longer though more slender. Hume's measurements refer to one pair of birds only, but he gives the weight of both male and female as 8 ozs.

*Distribution.*—The home of this little Sand-Grouse is Abyssinia, Nubia, Egypt in the extreme South and South Arabia. Thence it extends East through South Persia, Baluchistan and South Afghanistan into Sind. To the South it ranges into Somali land and to the West and North-West into the Soudan and the Sahara. The most Northern record in Persia I can find is that of a bird from the Tigris, N. of the Persian Gulf and it seems also not to work much North of Mecca or Jeddah in Western Arabia, though it thence works North and East round the Persian Gulf.

Within Indian limits the Close-barred Sand-Grouse has only been obtained in Sind, West of the Indus, from Gul Mahomed, Mehar, Upper Sind, where Hume first came across it, to Karachee in the extreme South.

They are, of course, only winter visitors occurring some years in fair numbers whilst in others very few, if any, visit India at



all. They appear never to arrive before January and all leave again before April, the majority in early March. Hume says of these birds: "With us they are generally met with in pairs or parties of three or four, in the neighbourhood of some little patch of cultivation, or where broken, rocky ground, or scrub afford some kind of cover. They lie well and though they fly fast enough, like all their congeners when well under weigh, rise an easy shot."

There is practically nothing else on record about this Grouse in India and Blanford in his *Geology and Zoology of Abyssinia* gives the best description extant of the habits of this little Sand-Grouse (p. 419 *et seq.*): "This bird has precisely the same habits as the closely allied *Pt. fasciatus* of India. It is rarely if ever seen on open sandy plains; like *Pt. exustus*, it keeps to bush and thin tree jungle, and is usually found solitary, in pairs, or at the most two or three pairs together. I once came upon a considerable flock in January, and possibly at that time these birds may collect in large numbers; but in May, June, July and August, it was rare to see more than four together, except about watering-places. When disturbed, the Sand-Grouse rises with a sharp cackling cry, affording a very difficult shot. It does not rise high, and usually settles again after a short flight. All kinds of *Pterocles*, as is well known, fly to water at particular hours in the day, the hours varying with different species. *Pt. exustus* drinks about 9 a. m. and 4 p. m. In the present case the drinking hours are at daybreak in the morning, and at dusk in the evening, as is also the case with the Indian *Pt. fasciatus*, the crepuscular habits of which are mentioned by Jerdon, ('Birds of India'; vol. ii, p. 498), and have been noticed by myself also. In the semi-desert country West and North-West of Massowah, in which *Pt. lichtensteini* abounds, and there are but few places where water is found, the scene at each spring of an evening after a hot day especially is very interesting. At Saati, Ailat, and Ain, there was a constant rush of these birds from sunset till dark, and again in the morning before sunrise. Singly and in small flocks, uttering their peculiar 'queep-queep' like note, they flew up and down the watercourse on their way to and from the water, keeping only a few feet above the bushes and low trees; the noise of their wings being heard in the dusk before the birds themselves appeared. Like all other Sand-Grouse, they are excellent eating, the flesh being rather hard but of delicious flavour; and our party used generally to shoot a few each evening, not an easy matter, for the great swiftness and power of wing possessed by these birds rendered them, in the dusk especially, by no means an easy shot."

"*Pt. lichtensteini* appears entirely confined to the tropical coast region. At some water in the Lebka Valley at Mohabar, only



2,000 ft. above the sea, scarcely any come to drink in the evening and at higher elevation not any were met with."

Occasionally, at all events the Close-barred Sand-Grouse collects in flocks of some size for Yerbury (*ibis*, 1886) speaks of finding a flock of eighty to a hundred individuals" at Shulaif near Lakey.

There is hardly anything on record about the breeding of this Sand-Grouse, although it must breed practically throughout its range. Ogilvie Grant, in his Game-Birds, quotes Heuglin to the effect that he found nests of this species containing "two cylindrical eggs, much the colour of dirty and faded Pewits eggs."

There is one egg of this species in the British Museum collection taken at Moraul, by Malan, in 1851. In ground colour this is a dirty yellowish stone colour, or earth colour, and it is rather profusely covered all over its surface with largish blotches of dirty vandyke brown and with others again underlying these of dull lavender grey. It is of a dull, glossless surface with a texture comparatively rough to both touch and sight. In general appearance it is like a small, pale and very dull coloured egg of *Pteroclorus alchata*, but it can be matched by no egg I have seen in very large series of the latter and its texture is totally different.

It measures 1. 70"  $\times$  1. 20" ( $=41 \times 27.3$  mm.). There is no date given to shew in what month it was taken. It came to the Museum with the rest of the Crowley Bequest and in the Crowley Catalogue there is the following remark: "One egg from Minereh. Revd. S. C. Malan, *ex* Tristram 'Tristram says the species is not quite certain'."

(To be continued).



## SCIENTIFIC RESULTS FROM THE MAMMAL SURVEY.

BY KATHLEEN V. RYLEY.

## VI.

## A.—TWO NEW VARIETIES OF VANDELEURIA.

In going through the Vandeleuria group, I find considerable variation in size among the specimens available for examination. Those from Coorg are the largest and probably represent *V. nilagiricus*, but at present there is no example from the Nilgiris for comparison. A series from the Kolaba District are also rather large, but come nearest to the type of *oleracea*, which was taken by Col. Sykes in 'the Dukhun.' On the other hand five specimens collected by Mr. Wroughton in the Surat District are all decidedly smaller, and I propose to describe them under the name of

## VANDELEURIA WROUGHTONI, sp. n.

A Vandeleuria similar to *oleracea* in general appearance, but smaller throughout, and of rather a lighter and more rufous colour.

Fur soft; tail longer than head and body; ears rather large; general colour above rufous fawn, base of fur ashy-grey, tips reddish yellow; flanks paler in colour; underside pure white; limbs the same colour externally as the body, and white on the inner side; feet rather lighter in colour than body; tail thinly covered with light hairs.

*Dimensions of the type* (measured in the flesh):—

Head and body 71 (82.8), tail 103 (115), hindfoot 18 (18.8), ear 14 (15).

*Skull*:—Greatest length 20.8 (23.2), condylo-incisive length 18.8 (21.8), basilar length 16 (18.3), length of upper molar series 3.7 (4), diastema .5 (5.9); nasals 7.3 (7.8); zygomatic breadth 11.6 (12). The numbers in brackets refer to the average size of a series of six from Kolaba representing *V. oleracea*. All the specimens in both series are fully adult.

*Habitat*:—Patal, Surat District. Altitude 200 ft.

*Type*:—Old male. B. M. Nos. 98. 4. 2. 31. Collected by Mr. Wroughton, 19th February 1898, and presented by him to the National Collection.

Furthermore, a series of four specimens from Lunwa, Palanpur (Gujerat) are so much lighter in colour that they should apparently be separated subspecifically.

## VANDELEURIA OLERACEA SPADICEA, subsp. n.

A Vandeleuria similar to *oleracea* in size, but very different in colour, having a much lighter and more reddish fawn coat. It is also much paler than *V. wroughtoni*, besides being larger.

Fur very soft. Tail longer than head and body. General colour above light sandy red, base of hairs, dark slate grey; the middle of the back is shaded with brown; flanks lighter; belly pure white;



## SCIENTIFIC RESULTS FROM THE MAMMAL SURVEY. 659

limbs same colour as body and white on the inner side; feet covered with hairs of a lighter shade than the body; tail sparsely covered with short hairs.

*Dimensions of the type* (measured in the flesh).—Head and body 85 mm, tail 117, hindfoot 19, ear 16; weight  $\frac{3}{4}$  oz.

*Skull*:—Greatest length 23.7, condylo-incisive length 21.9 mm, basilar length 19, length of upper molar series 3.9; diastema 6; nasals 8.5; zygomatic breadth 12.3.

*Habitat*:—Lunwa, Palanpur, Gujerat. Altitude 150 feet.

*Type*:—Old male. B.M. No. 13. 8. 23. 4. Original No. 2940. Collected 9th April 1913 by C. A. Crump and presented to the National Collection by the Bombay Natural History Society.

This subspecies is readily distinguished by its light sandy-red colour.—*V. oleraceus* is darker and browner in appearance.

## B.—A NEW SUBSPECIES OF MILLARDIA.

The large series of *M. meltada* collected at Lunwa, Palanpur, are so much lighter in colour than all the specimens from Dharwar, Kanara, Coorg, etc., that I propose to make them a subspecies of *M. meltada*, which was originally described from the Southern Mahratta Country. A specimen from the Punjab, collected by Major Dunn, had already been noticed by Mr. Wroughton as being different from the ordinary *M. meltada*.

## MILLARDIA MELTADA PALLIDIOR.

*The Northern soft-furred Field-Rat.*

A *Millardia* similar to *meltada* in general appearance, but differing markedly from that species in colour, being a light sandy grey, while *meltada* is a darkbrown-grey.

Fur soft and silky. Tail about the same length as head and body. General colour above pale sandy-grey with a slight yellowish tinge, and some brown speckles. Hairs dark-grey at the base and yellowish white at the end, some with brown tips; paler on the flanks shading into a grey white underside; belly with a much whiter appearance than in *meltada*, as the grey hairs, instead of only being tipped with white, are white for more than half their length, the base only being grey. Chin and inner side of legs also much whiter. Feet covered with white hair, tail sparsely covered with hair, darker above and paler below.

*\*Dimensions of the type* (measured in the flesh):—

Head and body 125 mm., tail 125, hindfoot 24, ear 19; weight  $2\frac{1}{2}$  ozs.

\* There is a considerable variation in size among the individuals of the series. One large male has a head and body measurement of 146 mm. and is proportionately large throughout, but the one selected as type is of a more average size.



*Skull*.—Greatest length 32.2 mm., condylo-incisive length 31.3, basilar length 27.2, length of upper molar series 5.5; diastema 9.3; nasals 12.3; zygomatic breadth 15.5.

*Habitat*.—Lunwa, Palanpur, Gujerat. Altitude 150 feet.

*Type*.—Adult male. B. M. No. 13. 8. 23. 3. Original No. 3196. Collected 13th April 1913 by C. A. Crump and presented to the National Collection by the Bombay Natural History Society.

The characteristic pale-grey colour is very constant throughout the fine series of twenty-three specimens.

#### C.—TWO NEW SUBSPECIES OF MUNGOOSE.

Three specimens of mongoose from Palanpur are so conspicuously pale in colour in comparison with the eighty odd specimens already obtained during the survey, and with those in the British Museum, that I consider that a new subspecific name appears to be necessary for them.

#### MUNGOS MUNGO PALLENS, subsp. n.

##### *The pale-grey Mongoose.*

A mongoose similar to *Mungos mungo* in size and general appearance but differing considerably in colour and in the coarseness of the speckles.

Following Mr. Wroughton's example, I am taking the Dharwar group of mongoose as typical of *mungo*, the type locality of which is not known; but as he has pointed out, the S.-W. Coast may be accepted, as the name is based on the Portuguese name of the animal.

Whereas this southern species has a general colour of dark steel-grey, closely speckled with deep-brown, which gives a very dark impression, the Palanpur specimens have a general colour of light (almost whitish) grey coarsely speckled with light-brown. The under fur of *mungo* is a pale brownish grey, that of *pallens* is practically white. The head and feet of *pallens* are of a red roan colour; the southern specimens have very dark-brown feet, and no roan on the head. The tail is also paler, the tip being nearly white. The throat and belly are very light, being dirty white in some cases, while *mungo* has a yellow-brown underside, slightly speckled with grey.

*Dimensions of the type* (measured in the flesh):—

Head and body 378 mm., tail 398, hindfoot 74, ear 27, weight 3½ lbs.

*Skull*.—Condylo-incisive length 79.3, basilar length 73.2, palatal length 41.5; front of canine to back of carnassial 25.3; breadth across carnassials (from outside) 26; zygomatic breadth 41.1; least inter-orbital breadth 15.5; inter-temporal constriction



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12; breadth across bullæ (from outersides) 30; squamal breadth of cranium 28·2.

*Habitat*.—Palanpur, Gujerat. Altitude 150 feet.

*Type*.—Old male. B. M. No. 13. 8. 23. 2. Original No. 2765. Collected 21st March 1913 by C. A. Crump and presented to the National Collection by the Bombay Natural History Society.

Three specimens in the British Museum Collection from Sambar, Rajputana, agree with this Palanpur series of *pallens*. This Mongoose differs from *M. ferrugineus*, Blanf. (Larkhana, Sind). in not having a red head or red tips to the hairs.

MUNGOS AUROPUNCTATUS HELVUS, subsp. n.

*The small yellow Mongoose.*

A small mongoose closely allied to *M. auropunctatus pallipes*, Blyth, but distinguished by its paler and yellower colour and by its yellow feet, which are scarcely perceptibly speckled.

General colour yellow grey, minutely speckled with brown; tail of same colour and about 2 inches shorter than head and body. Under fur drab, very light-brown at base (in *pallipes* the base is seal brown). Forehead of a deeper yellow buff, feet light yellow, almost without speckles. Underside pale yellow drab.

*Dimensions of the type* (measured in the flesh) :—

Head and body 303 mm., tail 258, hindfoot 50, ear 22, weight 1 lb. 3 ozs.

*Skull*.—Condyllo-incisive length 63·3; basilar length 58·9; palatilar length 32; front of canine to back of carnassial 20·7; breadth across carnassials (from outersides) 20; zygomatic breadth 30·8; squamosal breadth of cranium 22·4; breadth across bullæ 23·8.

*Habitat*.—Deesa, Palanpur, Gujerat. Altitude 450 feet.

*Type*.—Adult male. B. M. No. 13. 8. 23. 1. Original No. 3191. Collected 5th May 1913 by C. A. Crump and presented to the National Collection by the Bombay Natural History Society.

These nine specimens from Palanpur are very constant in colour, and although they bear a strong resemblance to *Mungos auropunctatus pallipes* from Kandahar, they are decidedly yellower in their general appearance.

D.—FUNAMBULUS TRILINEATUS, Kel.

*The Newera Eliya ground Squirrel.*

1852. *Sciurus trilineatus*, Kelaart, Prod. p. 54.

1891. *Sciurus sublineatus*, Blanford, Mammalia, No. 256 (*partim*).

The Ceylon specimens of this squirrel differ sufficiently to make it necessary to separate them from the S. Indian *F. sublineatus*, and



I therefore give a description of the points in which the differences are most noticeable. The name of *trilineatus* must be used as although it only appears as a *nomen nudum* in 1850\* and in 1851† Blyth mentions it as a synonym of *Sc. delesserti*, Kelaart published a description of the Ceylon squirrel under this name in 1852, though he did not separate it from the S. Indian species and gave Waterhouse the credit of describing it, including *Sc. delesserti* and *sublineatus* as synonyms.

It is a small *Funambulus* similar to *sublineatus* in general appearance, but differing from that species in being larger throughout, and darker in colour, having more brown and less of the olive shading which is pronounced on the mainland species, this browner tinge being especially noticeable on the flanks; the tail much more bushy, the hairs decidedly longer and more coarsely speckled; stripes down the back wider and less distinct. The skull measurements larger. Fur soft and very dense.

General colour dark brown finely speckled with yellow, three slightly paler longitudinal stripes with a darker brown, less speckled, fur between them, the stripes become indistinct on the shoulders and rump. Underside pale tawny; flanks ruddy brown. The hair on the tail is black at the base, followed by a narrow band of tawny, then a wide black band tipped with pale yellow, while in *sublineatus* the hairs are much shorter and evenly speckled brown and yellow throughout.

*Dimensions* (measured in the flesh).—Head and body 125 (120) mm.; tail 122 (117); hindfoot 31 (29); ear 13 (13).

*Skull*.—Greatest length 37.7 (35) mm.; condylo-incisive length 32.5 (30); basilar length 27.6 (25.3?); tooth row (upper molar series) 7 (6.6); diastema 8.4 (7); nasals 11 (9.9); zygomatic breadth 20.8 (19.2).

(The figures in brackets refer to a specimen of *sublineatus* from Coorg.)

The specimen described is a young male, collected by Major E. W. Mayor at Kottawa, S. P. Ceylon, on April 11th, 1913. Original No. 13.

Five specimens from Ceylon and 19 from Southern India are available for comparison and the distinguishing characters are constant throughout the two series.

E.—*SCIURUS ATRODORSALIS SHANICUS*, subsp. n.

*North Shan States Black-backed Squirrel.*

A squirrel similar to *Sciurus atrodorsalis* but without the red underside and practically without the black patch on the back.

\* Journ., R.A.S., Ceyl., p. 310.

† J.A.S.B., XX, p. 165.



General colour rather paler than "deep olive" (Ridgeway); hairs banded black and yellow. There is a darker, blackish tinge on the back in some cases, mostly in young specimens, in many adults it is very slight and hardly noticeable; even in the most pronounced examples it is only the ends of the hairs that are black; in the black patch of *atrodorsalis*, the hairs are black throughout. The head is similar to the body in colour, whereas in *atrodorsalis* it is reddish yellow; the ears only in *a. shanicus* are rufescent. The whiskers in all these specimens are black, the type of *atrodorsalis* and most of the other skins have white ones. The fur is dark slate grey at then base and then banded yellow and black. The underside is like the back only more shaded with yellow, especially on the underside of the arms and legs, which in some cases are rufous, but none of the specimens have the chestnut red underside which is so marked in most of the *atrodorsalis* skins. Feet, same colour as body, tail banded black and yellow, the same as above.

Skull characters as in *atrodorsalis*, as far as can be determined, there being practically no whole skulls of the latter for comparison, in some instances the zygomatic arch is wider in *atrodorsalis*.

The co-types of *Sciurus atrodorsalis* are two dilapidated specimens received from the East India Company's Museum, and marked as coming from "Bhotan." This is evidently a mistake, as they closely agree with a series from Moulmein, which may therefore be taken as the type locality.

In addition to this present series of 32, there are 6 other specimens available for comparison from the N. Shan States, and as they are all very constant among themselves it seems necessary to separate them subspecifically; Mr. Wroughton had, I believe, intended to separate them some time ago.

*Dimensions of the type* (measured in the flesh):—Head and body 208 mm.; tail 183; hindfoot 48; ear 22.

*Skull*.—Greatest length 51.1mm.; condylo-incisive length 45.9; basilar length 39.9; tooth row 10.5; diastema 11.1; zygomatic breadth 29.9; nasals 15.

*Habitat*.—Gokteik, Northern Shan States, Burma. Alt. 2,133 feet.

*Type*.—Adult Male. B. M. No. 13.11.18.1. Original No. 2765. Collected 23rd April 1913, by G. C. Shortridge, and presented to the National Collection by the Bombay Natural History Society.

#### A NEW FIELD-MOUSE FROM BURMA.

*F.*—*MUS COOKII*, sp. n.

*The Burma Field-Mouse.*

A mouse most nearly resembling *Mus booduga* but differing from that species in being larger throughout.



General colour above dark brown speckled with buff, flanks paler than back, fur soft slate grey at base, tips light brown. Undersurface grey, base of the hairs being slate grey, terminal half white, feet white, tail dark above and pale below. Skull similar to *booduga* in appearance, but larger, the teeth especially being bigger and stronger.

*Dimensions of type* (measured in the flesh).—Head and body 88 (60-75); tail 91(55-74); hindfoot 19(14-17); ear 17(12-14).

*Skull*.—Greatest length 23.3; condylo-incisive length 22.8; (18.4-19.5); basilar length 19.4(16-18.5); diastema 6.7 (5.4-6.4); tooth row 4.2(3.6-3.8); zygomatic breadth 12 (9.6-10.8); nasals 8.5 (7.4-8.5).

(The figures in brackets are taken from specimens of *M. booduga* from Dharwar, the Southern Maharatta country being the type locality).

*Habitat*.—Gokteik, Northern Shan States, Burma. Altitude 2,133 feet.

*Type*.—Adult male. B. M. No. 13.11.18.2.; original No. 2755. Collected by G. C. Shortridge, 22nd April 1913, and presented to the National Collection by the Bombay Natural History Society. The series consists of 4 adult and immature specimens. I have named this species after Mr. J. P. Cook who assisted Mr. Shortridge by sending in a small collection of specimens from Moulmein.



# THE PALMS OF BRITISH INDIA AND CEYLON, INDIGENOUS AND INTRODUCED

BY

E. BLATTER, S.J.

PART X.

(With Plates LVII—LXIII, and text figure 30.)

(Continued from page 463 of Volume XXII.)

*C. Sub-tribe: Iriarteae.*

Spadix below or rarely between the leaves, simple or branched; peduncle clothed with several tubular spathes. Flowers oblique, free on the surface of the stout rhachis or slender branches. Female and male flowers in clusters of 3, or both sexes by abortion on separate spadices (monœcious). Male flowers: calyx small, corolla oblique, valvate, or only with the apices overlapping; stamens 6-∞, free; anthers erect. Female flowers: calyx short, staminodes never united, often resembling fertile stamens; ovary of 3 united carpels, oblique, 3-locular.

Fruit nearly always monocarpellary with 1 seed; berry with thin endocarp; raphe branched.

DISTRIBUTION.—Tropical America, from Costa Rica in the north to Juan Fernandez in the south.

*Iriarteae*, R. & Pav., *Catoblastus*, Wendl., *Wettinia*, Poepp. & Endl., *Ceroaylon*, H. B. Kth., *Juania*, Dr.

No representatives in India.

*D. Sub-tribe: Morenieae.*

Spadix below or between the leaves; spathes tubular. Flowers free on the surface or slightly sunk in cavities, symmetrical, unisexual on the spadix or male and female together. Calyx short, 3-lobed or of 3 leaves; petals free or united, valvate (except some species of *Chamaedorea* and *Synechanthus* which have an imbricate corolla in the female flowers). In the female flower the ovary completely or incompletely 3-locular.

Fruit a berry of 1-3 separately developing carpels. Leaves regularly paripinnate (rarely pinnately dentate).

DISTRIBUTION.—All the genera (except *Hyophorbe* and *Chrysalidocarpus*) are American, especially tropical South Mexican.

*Chamaedorea*, Willd., *Morenia*, R. & P., *Kunthia*, Humb. & Bonpl., *Chrysalidocarpus*, H. Wendl., *Hyophorbe*, Gaertn., *Gaussia*, Wendl., *Pseudophenix*, Wendl. & Dr., *Synechanthus*, Wendl., *Reinhardtia*, Liebm.



Key to the genera described below :

Flowers diœcious	{ stem cane-like	... <i>Chamaedorea</i> .
	{ stem not cane-like	... <i>Chrysalidocarpus</i> .
Flowers monœcious	... ..	... <i>Hyophorbe</i> .

*CHAMAEDOREA*, Willd. Spec. Pl. IV. 638.

(From the Greek "chamai," on the ground, and "dorea," a gift; alluding to the fruits of the palm being easily reached.)

R. & Pav. Prodr. Fl. Peruv. & Chil. 144, t. 31 (Nunnezharia).—Otto, Gartenz, 1834, 145, 153, t. 6.—Mart. Hist. Nat. Palm. II, 3, t. 3; III, 157, 307, t. 126-138.—Kunth. Enum. Pl. III, 170.—Wendl., Bot. Zeitg. 1859, 29, 102.—Drude Fl. Brasil. III, II, 527, t. 125.—Rgl. Grtfl. 1880, 101.—Benth. & Hook. Gen. Pl. III, II, 910, 59.

Stem unarmed, slender, cane-like, annulate, rarely climbing, often soboliferous and forming small tufts. Leaves terminal, mostly pinnate with broad-lanceolate pinnæ, in some species only a bifid apex.

Spadix, when in flower, mostly below the crown of leaves, long peduncled, with from 3-7 tubular spathes; male spadix with mostly yellow flowers; female spadix with smaller, greenish flowers. Flowers diœcious, scattered or dense on the simple or oftener on the simple-branched spadix. Male flowers with short, cupular trilobed calyx; corolla of 3 petals, valvate; stamens 6; pistillode columnar. Female flowers: calyx tripartite, cupular; corolla tripetalous, tripartite or tridentate, valvate; no staminodes; ovary trilocular, 3-ovuled; style short, stout or elongate.

Berry 1 (-3) consisting of 1 (-3) carpels with the remains of the style at the base, the size of a pea, often brightly coloured. Seed round or elliptic; albumen equable.

Species about 60.—Tropical America.

CULTIVATION IN EUROPE.—The species of *Chamaedorea* are stove palms. In their natural habitats they are invariably growing under the shade or tall forest trees, and never in exposed situations. In the stove, therefore, shade and moisture are essential. They thrive best in a compost of two parts spongy peat, one part loam, and one of sand, the whole well mixed together.

Dammer observes that most species do well in the drawing-room and that some stand at a pretty low temperature in winter as v. g. *C. concolor* and *C. desmoncoides*. Others are more delicate (as v. g. *C. geonomiformis*).

Hybrids are easily produced.

*CHAMAEDOREA AREMBERGIANA*, H. Wendl. Ind. Palm. 66; Kerch. de Denterg. Les Palmiers 75, f. 33.—*C. latifrons* and *latifolia*,

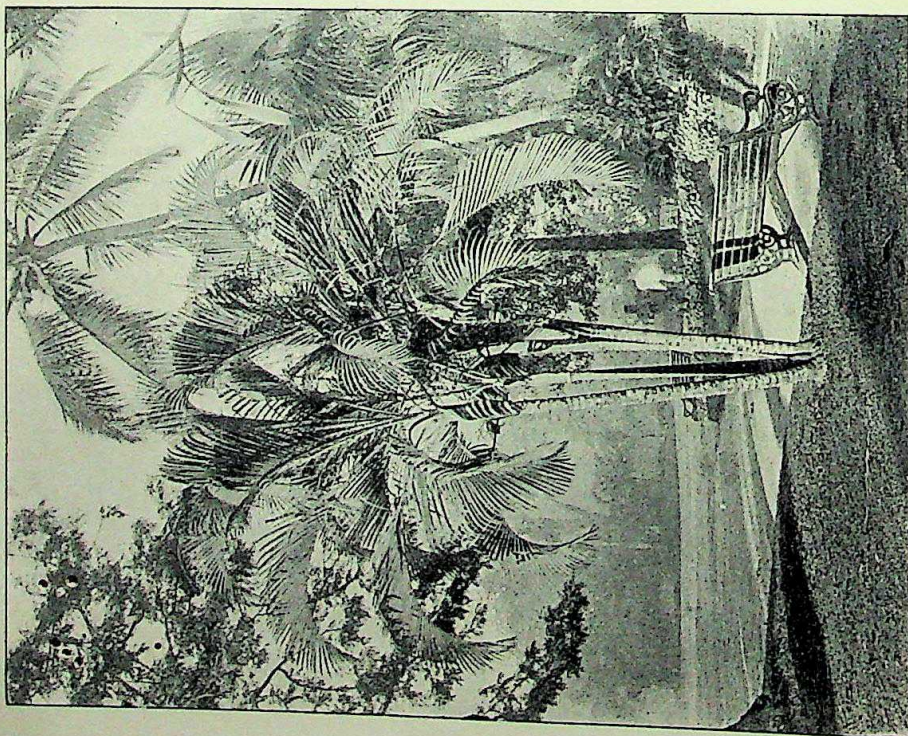








FLOWERING SPADIX OF *Chrysalidocarpus lutescens*, H. Wendl.



*Chrysalidocarpus lutescens*, H. Wendl.



Hort.—*Spathascaphe aarenbergiana*, Oerst. Palm. Centramer. in Vidensk. Meddel. Nat. For. Kjöbenhav. 1858, 30, and L' Amérique Centrale t. 7, f. 29-37.

NAMES.—English: Aremberg's Mountain Palm, Merman's Shaving-brush.

German: Aremberg's Bergpalme.

French: Chamaedore, Chamaedorée.

DESCRIPTION.—Stem about 6 feet high, green, ringed at intervals of 2 inches. Leaves 5-6, erecto-patent, pinnate, 6-7 feet long; petiole slender, with a long cylindric sheath; leaflets about 10-15 pair, drooping 1-1½ feet long, alternate, oblong-lanceolate from a broad, sessile base, gradually narrowed to a very fine point, plicate with about 30 ribs, bright green above, rather pale beneath; petiole nearly terete.

Inflorescence from below the leaves. Spathes many, sheathing, cylindric, 6-10 inches long, forming a tube 1 foot long, which completely covers the peduncle of the spadix, lightly rolled together with subacute erect tips, the uppermost far exceeding the spadix, green, or the lower brown. Male spadix subumbellately branched within the spathes, the branches effuse, pendulous, 1 foot long and as thick as the little finger, cylindric, pale, straw-coloured, dense-flowered, terminated by the naked subulate tip. Flowers about ⅙ inch in diameter. Calyx very short, 3-toothed. Corolla-lobes rounded, concave, fleshy; stamens 6, filaments very thick, anther-cells divaricate; pistillode columnar, tip 3-lobed. Female spadix simple, erect, six inches long, rather stouter than the branches of the male spadix. Petals transversely oblong, concave; staminodes none; ovary subglobose, 3-lobed, stigmas 3, minute, sessile, trigonous.

HABITAT.—Guatemala.

Cultivated in Indian gardens.

*CHRYsalIDOCARPUS*, H. Wendl. Bot. Zeitg. (1878), 117.

(Wendland has chosen this name because the fruit, deprived of its epicarp, has the appearance of a chrysalis. The name, therefore, does not mean "golden fruit" as suggested in L. H. Bailey's Cyclopædia of American Horticulture, Vol. 1, 301.)

Benth. and Hook. Gen. Plant III, II, 882.—Becc. Palme del Madag. p. 3—Mart. Hist. Nat. Palm. III, 164, t. 143 (*Hyophorbe*).—Drude, Palmae, in Nat. Pflanzenf. p. 64.

Stem unarmed, cylindric, soboliferous, annulate. Leaves terminal, pinnate; segments very numerous, straight, or slightly falcate, bifid at the apex. Spadix ramose. Flowers dioecious. Male flowers: fertile stamens 6, subequal, filaments subulate, anthers versatile; rudimentary ovary conical or columnar, more or less



trifid or trilobed at the apex. Female flowers: ovary globose-ovate or oblong; stigmas stout, triangular, patent at the time of fertilization.

Fruit baccate, ovoid-elliptical; stigmas subbasilar; epicarp very thin; fibres of mesocarp applanate. Seed oblong-obconical, acute at the base; albumen equable; embryo at or below the middle of the back.

Species about 7.

DISTRIBUTION.—Madagascar (elsewhere?).

Two species are cultivated in India :

Segments of leaves 40-60 pairs ..... *C. lutescens*.

Segments of leaves much more numerous... *C. madagascariensis*.

*CHRYSLIDOCARPUS LUTESCENS*, H. Wendl. Bot. Zeitg. (1878), 117; Benth. & Hook. Gen. Plant. III, II, 882.—*Areca madagascariensis*, Mart. ex Becc. Palme del Madag. p. 2.—*Areca madagascariensis*, Lodd. ex Dammer, Palmenz. p. 91.—*Areca lutescense*, Bory ex Salomon Palmen, p. 110.—*Areca Indica*, Hort.—*Areca barbonica*, Hort.—*Areca Dicksonii*, Hort.—*Areca flavescens*, Hort.—*Hyophorbe indica*, Hort. ex Drude l. c. p. 64.—*Hyophorbe lutescens*, Hort. ex Drude l. c. p. 64.—*Hyophorbe Commerstoniana*, Mart. Hist. Nat. Palm. III, 164, t. 143, I, (non *H. Commerstonii*, Mart. in Herb. Paris.)—*Sublimia vilcaulis*, Commers. ex Salomon, Palmen, p. 110.

NAMES.—Yellow Areca Palm (English).

Arec jaunâtre, Arec poison, Palmiste Marron, Palmiste poison (French).

Gelbliche Puppen-Areka (German).

DESCRIPTION.—Stem about 25 feet high, cylindric, about 3 inches in diameter, soboliferous, annulate, rings more or less 4 inches distant from each other. Leaves 6-8, terminal, spreading, more or less 8 feet long, regularly pinnatisect, vagina about  $1\frac{1}{2}$  feet long, cylindric; petiole about 2 feet long, narrowly and deeply canaliculate above, margins acute; rhachis about 5 feet long; segments dark green, 40-50 pairs, at base and apex of leaf approximate, the middle ones 2 inches distant from each other, narrowly lanceolate, contracted at the base, long acuminate at the apex and unequally bifid.

Flowers dioecious, white.

Fruit consisting of one carpel, baccate, black-violaceous, resupinate, ellipsoideo—turbinate. Mesocarp consisting of applanate fibres, adherent to the membranous endocarp. Seed oblong-obconical, acute at the base, branches of raphe about 18, radially ascending and slightly anastomosing on the dorsal side. Albumen equable. Embryo below the middle height of the albumen.

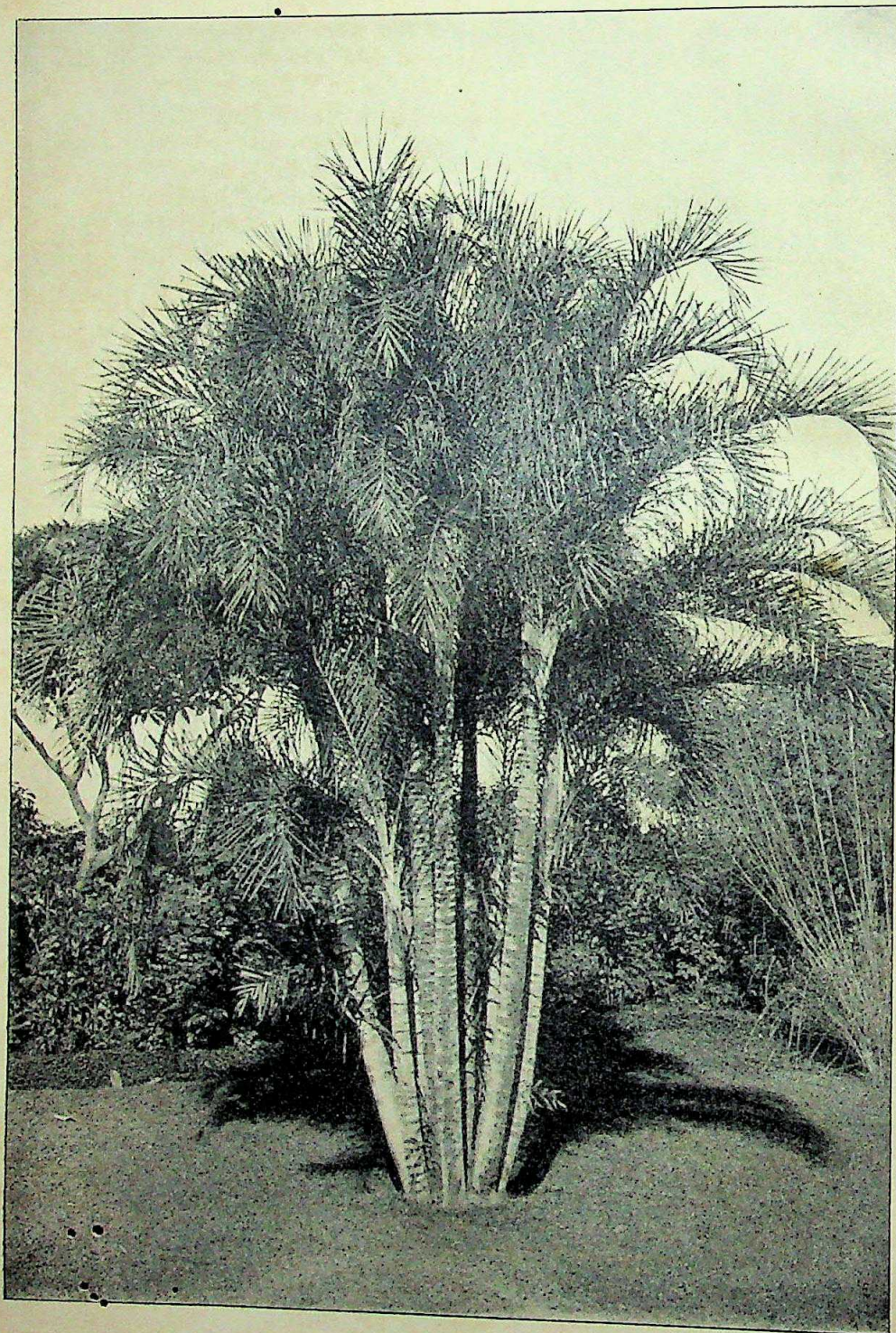
HABITAT.—Madagascar (Salomon, Palacky<sup>1</sup>), Bourbon (Bailey's Cyclop. Americ. Horticult).

<sup>1</sup> Palacky, J. Catalogus plantarum Madagascariensium. Prague, 1907.









• *Chrysalidocarpus madagascariensis*, Becc. (*Dypsis madagascariensis* of Indian Gardens).



GARDENING IN EUROPE.—“In growing *Chrysalidocarpus* in quantity, it will be found a good plan to sow the seeds either on a bench, in boxes or seed pans, so prepared that the seedlings will remain in the soil in which they germinate until they have made two or more leaves. The first leaf made above the soil is small, and if plants are potted off at this stage they must be very carefully watered in order not to sour the soil. In the preparation of the receptacles for the seed, a little gravel in the bottom will be found good, as the roots work very freely through it, and when the time comes to separate the plants previous to potting, it is an easy matter to disentangle the roots without bruising them. Probably the plan which works best is to wash the soil and gravel entirely from among the roots. Pot in soil not too dry, and for the next few days keep the house extra warm and humid, and the plants shaded from the sun without any moisture applied to the soil for the first few days.” (Cyclop. Amer. Hort.).

ILLUSTRATIONS.—Plate LVIIA shows a characteristic tuft of *Chrysalidocarpus lutescens*, growing in Victoria Gardens, Bombay. There is a marked difference between this species and *Chrysalidocarpus madagascariensis*, represented on the next plate. The beautiful curves of the leaves and the smaller number of leaflets distinguish the former at once.

Plate LVII B shows a spadix of *Chrysalidocarpus lutescens* in flower. The peduncle of the inflorescence is covered by its sheaths, and only a few flowers are open near the tips of the branchlets.

I have to thank the Rev. Fr. Max Maier, S. J., for the two photographs.

*CHRYSLIDOCARPUS MADAGASCARIENSIS*, Becc. Engl. Bot. Jahrb. Vol. 38 (1907), Beibl. No. 87, p. 35.—*Dypsis madagascariensis*, Hort.—*Areca madagascariensis*, Hort.

DESCRIPTION.—Stem about 3 inches in diameter. Leaves interruptedly pinnate, rhachis about 8 feet long; petiole more or less  $1\frac{1}{6}$  foot long, canaliculate above; segments very numerous, about 90 pairs linear, the larger ones  $1\frac{1}{3}$ – $1\frac{2}{3}$  foot long,  $\frac{3}{5}$  inch broad, long acuminate, slightly bifid at the apex.

Spadix ample, 3-plicate-ramose, first scarcely furfuraceous, then quite glabrous; panicle ample, diffuse, branches patent, the floriferous branchlets filiform, about  $\frac{1}{12}$  inch in diameter and 8–10 inches long. The glomerulate flowers in 5-seriate pits which are narrow spirally arranged, supported by a very short subdimidiato-cupular bract; bracteoles very narrowly semilunar. Male flowers globose,  $\frac{1}{12}$  inch in diameter; sepals orbicular; petals twice as long as the sepals; anthers oblong; rotundate at the apex and scarcely apiculate, with parallel loculi; pistillode trigonous-pyramidal, acute. Female flowers ovate; sepals orbicular, petals twice as long as the



sepals, very broad, shortly apiculate; ovary gibbous-ovate, with triangular stigmas; staminodes 6.

Fruit ovoid-elliptic, at both ends slightly attenuate, straight (not sigmoidal), about  $\frac{1}{2}$  inch long,  $\frac{1}{4}$ - $\frac{7}{24}$  inch broad; remains of stigmas basilar; fibres of mesocarp applanate, uniseriate, spirally sinuose and anastomosing. Seed obovate, acute at the base; embryo about the middle of the back.

HABITAT.—There is scarcely a doubt that the palm comes originally from Madagascar (Beccari).

In Indian gardens the palm is generally known under the names of *Dyopsis* or *Areca madagascariensis*.

ILLUSTRATION.—On plate LVIII we reproduce a photograph of *Chrysalidocarpus madagascariensis* taken by Mr. Phipson. The crown of leaves is much denser than in the foregoing species, owing to the greater number of leaves and leaflets. In addition to this, the appearance of this palm is changed considerably by the fact that the tips of the leaflets are hanging over.

*HYOPHORBE*, Gaertn. Fruct., II. 186, t. 120.

(From the Greek "Hys," swine, and "phorbe," food)

Wendl. Illustr. Hort. 13, t. 462, 463.—Bak. Fl. Maurit. 382.—Benth. and Hook. Gen. Pl. III, II, 912, 62.

Stem of considerable height, often very thick; petiole subterete on the back, grooved or flat on the face with a large, complete, basal sheath; leaves pinnate with slightly reduplicate subopposite pinnae.

Monœcius. Flowers superposed in linear, spirally-arranged, 3-7-flowered clusters on the branches of a compound spadix, the females 1 or 2 at the base of the cluster. Spathes many, distichous, imbricated. Inner segments of the perianth valvate, twice as long as the outer. Male flowers: Stamens 6, included; filaments connate at the base; pistillode a triquetrous or conical column, shorter than the stamens. Female flowers: Staminodes forming a cup with 6 teeth.

Fruit a purplish drupe; scar of the stigma subbasal; mesocarp succulent and fibrous; endocarp chartaceous. Seed solitary, ascending; albumen homogeneous; raphe branching, but not anastomosing; embryo subapical or median.

SPECIES 3.—Mascarene Islands.

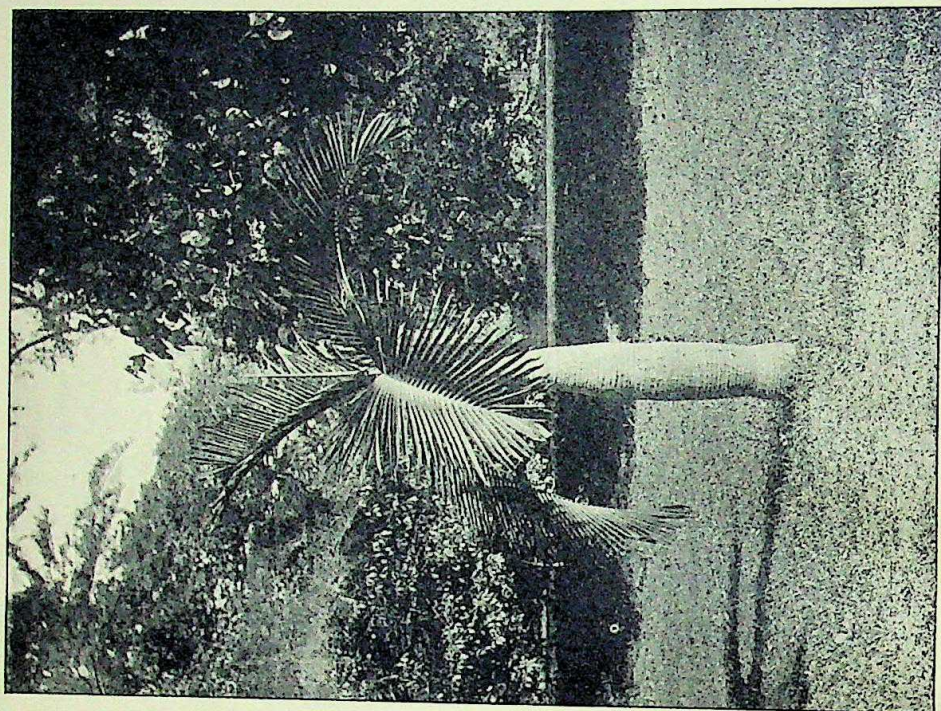
CULTIVATION IN EUROPE.—Ornamental, middle-sized stove palms. They grow well in a compost of loam, peat and leaf soil in equal parts with a liberal addition of sand. When they are fully grown about two-thirds of the compost should consist of loam. Propagation is effected by seeds, which are sown in a compost similar to the one just mentioned and placed in a moist gentle heat.







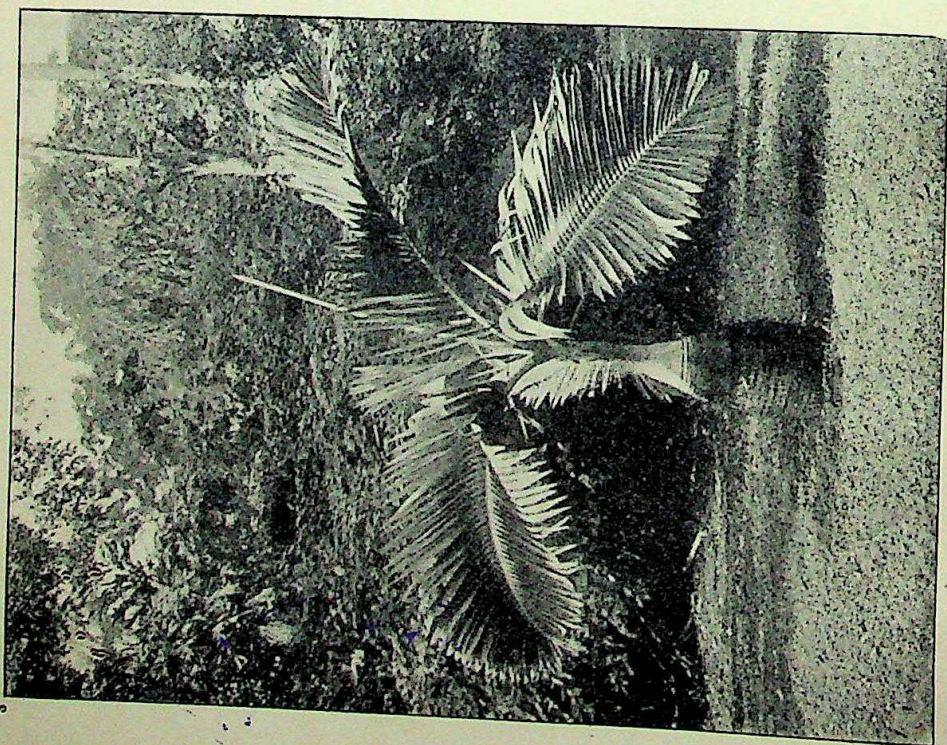
PLATE LIX. B



*Hyophorbe amaricaulis*, Mart.

PLATE LIX. A

JOURN. BOMBAY NAT. HIST. SOC.



YOUNG SPECIMEN OF *Hyophorbe amaricaulis*, Mart.



The following are cultivated in India :—

- Pinnæ with prominent lateral nerves ;  
 no yellow line on back of petiole ... *H. amaricaulis*.  
 Pinnæ with no prominent lateral nerves ;  
 a yellow line on back of petiole ... *H. Verschaffeltii*.

*HYOPHORBE AMARICAULIS*, Mart. Hist., Nat. Palm. III, 309 ; Baker Fl. Maurit. and Seych. 383 ; O. Drude *Palmae* 64.—*Sublimia amaricaulis* Commers.—*Hyospathe amaricaulis*, Hort.—*Areca speciosa*, Hort. and Versch.—*Areca purpurea*, Makoy.

NAMES.—Palmiste Gargoulette (French).

Bitterstielige Eberpalme, Viehfutterpalme (German).

DESCRIPTION.—Stem 60 feet high, 15-24 inches in diameter near the base, bottle-shaped, slightly diminishing upwards to the base of the leaf-sheaths, and there abruptly constricted. Leaf-sheath cylindrical ; petiole 12-18 inches long, somewhat trigonous, grooved on the face ; leaflets in 40-60 pairs, lanceolate, acuminate, 18 inches long, 2 inches broad, with the central and one lateral vein prominent on the upper surface, and several secondary veins also prominent beneath, which are clothed towards the base with sub-rigid, appressed, lanceolate scales.

Spadix with clustered branches ; peduncle 1 foot long. Pistillode of the male flowers elongated, grooved.

Fruit elliptic-oblong. Seed elliptical,  $\frac{1}{12}$ — $\frac{1}{11}$  inches long, with the branches of the raphe diverging a little above the hilum ; embryo subapical or median.

HABITAT.—Mauritius ; common on Round Island. (Endemic.)

ILLUSTRATIONS.—Plate LIXA shows a young specimen of *Hyophorbe amaricaulis*, growing in the Victoria Gardens, Bombay. The photograph was taken by Mr. Phipson. The specimen figured on plate LIX B is some years older and grows in the Sibpur Botanic Gardens. Both pictures show the characteristic bottle-shape of the stem, and in both we notice a stick-like young leaf just at the time when it begins to unfold.

*HYOPHORBE VERSCHAFFELTII*, H. Wendl., Illust. Hort. XIII, t. 462, 463 ; Baker, Fl. Maurit. and Seych. 383.—*Areca Verschaffeltii*, Lem. and Hort.

NAMES.—Palmiste marron (French).

Verschaffelt's Eberpalme (German).

DESCRIPTION.—Stem 25-30 feet high, 6-12 inches in diameter at the base, bulging after a few feet, reaching 12-24 inches in the middle, thence contracting upwards, rarely again bulging. Petiole about 3 inches long, subterete, slightly grooved on the upper surface, with a yellow band extending from the upper part of the leaf-sheath along the face of the petiole to the extremity of the blade ; leaflets 30-50 pairs, acuminate, 20-30 inches long,



1 inch broad; the central vein alone prominent, clothed on the under surface towards the base with short linear scales, which are often subrigid at the base.

Spadix with clustered branches; peduncle 8-14 inches long. Perianth orange. Pistillode of the male flower elongated, conical.

Fruit cylindrical-oblong. Seed sub-cylindrical,  $\frac{7}{12}$ -1 inch long,  $\frac{1}{4}$ - $\frac{1}{2}$  inch broad; the branches of the raphe diverging from the middle of the seed, the embryo median and horizontal.

HABITAT.—Rodriguez, not uncommon on the hill slopes. (Endemic).

ILLUSTRATION.—The young specimen of *Hyophorbe Verschaffeltii*, figured on plate LX, is growing in Mr. Millard's garden on Malabar Hill, Bombay. The owner was kind enough to supply the photograph. The stem is distinctly triangular, and as to the leaves, it is not difficult to find out the differences as regards number, size, shape and structure, which distinguish this species from *Hyophorbe amaricaulis*.

#### E. Sub-tribe: *Areceæ*.

Spadix below or between the leaves, always with 1-3 complete spathes, which open only when the male flowers begin to develop (except *Areceæ iguanurea*). Flowers free on the surface or in open cavities, monœcious in clusters of 3, the male pair behind the female flower, the upper part of the branches bearing only male flowers. Male flowers: often oblique; calyx small, imbricate; corolla large, valvate; stamens 6-8. Female flowers: calyx and corolla imbricate (exceptions sub A in the following key: corolla valvate). Ovary of 3 completely united carpels, always 1-locular with one seed by the abortion of 2 seeds, but with 3 apical stigmas.

Fruit a berry of 3 carpels and 1 seed. Leaves pinnate, mostly smooth.

DISTRIBUTION.—In all tropical regions except continental Africa: East-African islands, from India and Ceylon to New Zealand and the Chatham Islands; tropical America from Brazil to the Antilles.

*Dypsis*, Noronh., *Phloga*, Hook., *Hyospathe*, Mart., *Prestoea*, Hook., *Oreodoxa*, Willd., *Gigliolia*, Becc., *Howea*, Becc., *Linospadix*, Wendl. & Dr., *Carpowylon*, Wendl. & Dr., *Iguanura*, Bl., *Calyptrocalyx*, Bl., *Sommieria*, Becc., *Clinostigma*, Wendl., *Heterospatha*, Scheffer, *Jessenia*, Karst., *Roscheria*, Wendl., *Nephrosperma*, Balf., *Verschaffeltia*, Wendl., *Phœnicophorium*, Wendl., *Acanthophaenix*, Wendl., *Oncosperma*, Bl., *Euterpe*, Mart., *Oenocarpus*, Mart., *Ptychandra*, Scheff., *Cyphokentia*, Brongn., *Hydriastele* Wendl. & Drude, *Kentia*, Bl., *Kentiopsis*, Brongn., *Veitchia*, Wendl., *Drymophloeus*, Zipp., *Cyrtostachys*, Bl., *Ptychococcus*, Becc., *Ptychosperma*,





YOUNG SPECIMEN OF *Hyophorbe Verschaffeltii*, H. Wendl.







Labill., *Loxococcus*, Wendl. & Dr., *Actinorhytis*, Wendl. & Dr., *Rhop. loblate*, Scheff., *Ptychoraphis*, Becc., *Dictyosperma*, Wendl. & Dr., *Archontophœnia*, Wendl. & Dr., *Nenga*, Wendl. & Dr., *Cyphophœnia*, Wendl. & Hook., *Mischophlæus*, Scheff., *Pinanga*, Bl., *Areca*, L.

Key to the genera described below † :—

A. *Areceæ anomalæ*.—Spadix between or below the leaves branching, with two spathes of which at least the upper one is complete. Female flowers with valvate corolla. Ovary unilocular or sometimes with 2-3 ovules. Leaves unarmed, smooth.

Male calyx of rounded imbricate sepals.

Female corolla valvate throughout *Oreodoxa*.

B. *Areceæ iguanurææ*.—Spadix simple with a stout rhachis developed between the short-sheathed leaves. Spathes 1-3. The clusters of 3 flowers in open, flat, or lipped cavities of the rhachis. Male flowers with an imbricate calyx. Female flowers with a broadly imbricate corolla. Leaves unarmed :

Seed not erect, albumen not equable ... *Calyptrocalyx*.

Seed erect, albumen equable ..... *Howea*.

C. *Areceæ heterospathææ*.—Spadix branched, between the leaves. Spathes 2, pierced by the spadix, or upper spathe opening completely on the ventral side. Male flowers with an imbricate calyx. Female flowers with a broadly imbricate corolla. Ovary with 1 ovule. Leaves unarmed.

Pericarp smooth, albumen slightly ruminant *Heterospatha*.

D. *Areceæ aculeiferææ*.—Spadix once or twice branched, between or below the leaves. Spathes 2 or several, complete. Male flowers with an imbricate calyx. Female flowers with an imbricate corolla. Ovary with 1 ovule, united laterally with the wall. Leaves with long spines :—

(a) Spadix between the short-sheathed leaves. Albumen ruminant :

\* Leaves irregularly pinnatisect :

1. Spadix twice branched.

Stamens 6 ..... *Roscheria*.

2. Spadix once branched.

Stamens  $\infty$  ..... *Nephrosperma*.

\*\* Leaves bifid with pinnately dentate margin :

1. Stamens 6 ..... *Verschaffeltia*.

2. Stamens 15-20 ..... *Phœnicophorium*.

(b) Spadix below the long-sheathed leaves :

1. Albumen equable ..... *Acanthophœnia*.

2. Albumen ruminant ..... *Oncosperma*.

† We follow in the main Drude, *Palmae*, 65.



*E. Areceae infrapoliaceae.* Spadix one or several times branched, below the crown, hidden before flowering in the long sheaths of the axils. Spathes 1—3, complete. Calyx of male flowers mostly broadly imbricate. Corolla of female flowers broadly imbricate. Ovary with one central ovule.—Leaves unarmed.

I—Ovule and seed laterally more or less united with the endocarp.

(a) Albumen uniform.

- 1 Ovule and seed united with the endocarp to a little beyond the middle of the raphe ..... *Hydriastele.*
- 2 Ovule and seed united with the endocarp along the raphe from the base to the apex..... *Kentia.*
- 3 Ovule broadly united with the endocarp near the chalaza and consequently pendulous ..... *Cyrtostachys.*

(b) Albumen ruminant.

- 1 Leaflets truncate ..... *Ptychosperma.*
- 2 Leaflets truncate-dentate ..... *Loxococcus.*
- 3 Leaflets acuminate.
  - ° Rumination of the albumen deep, radial towards the centre of the seed ..... *Actinorhysis.*
  - °° Rumination of the albumen irregular or flat.
    - × Stamens 6, albumen deeply grooved along the raphe ... *Ptychoraphis.*
    - × × Stamens 6, Raphe without groove ..... *Dictyosperma.*
    - × × × Stamens 9—24..... *Archontophœnix.*

II—Ovule free, arising from the base of the loculus.

- 1 Female and male flowers in clusters of 3 reaching high up the branches *Pinanga.*
- 2 Female flowers at the base of the branches, solitary or few ..... *Areca.*

*OREODOXA.*—Kunth in Humb. et Bonpl. Nova Gen. et Sp. Pl. I, p. 244, edit. min. p. 305 (1815).

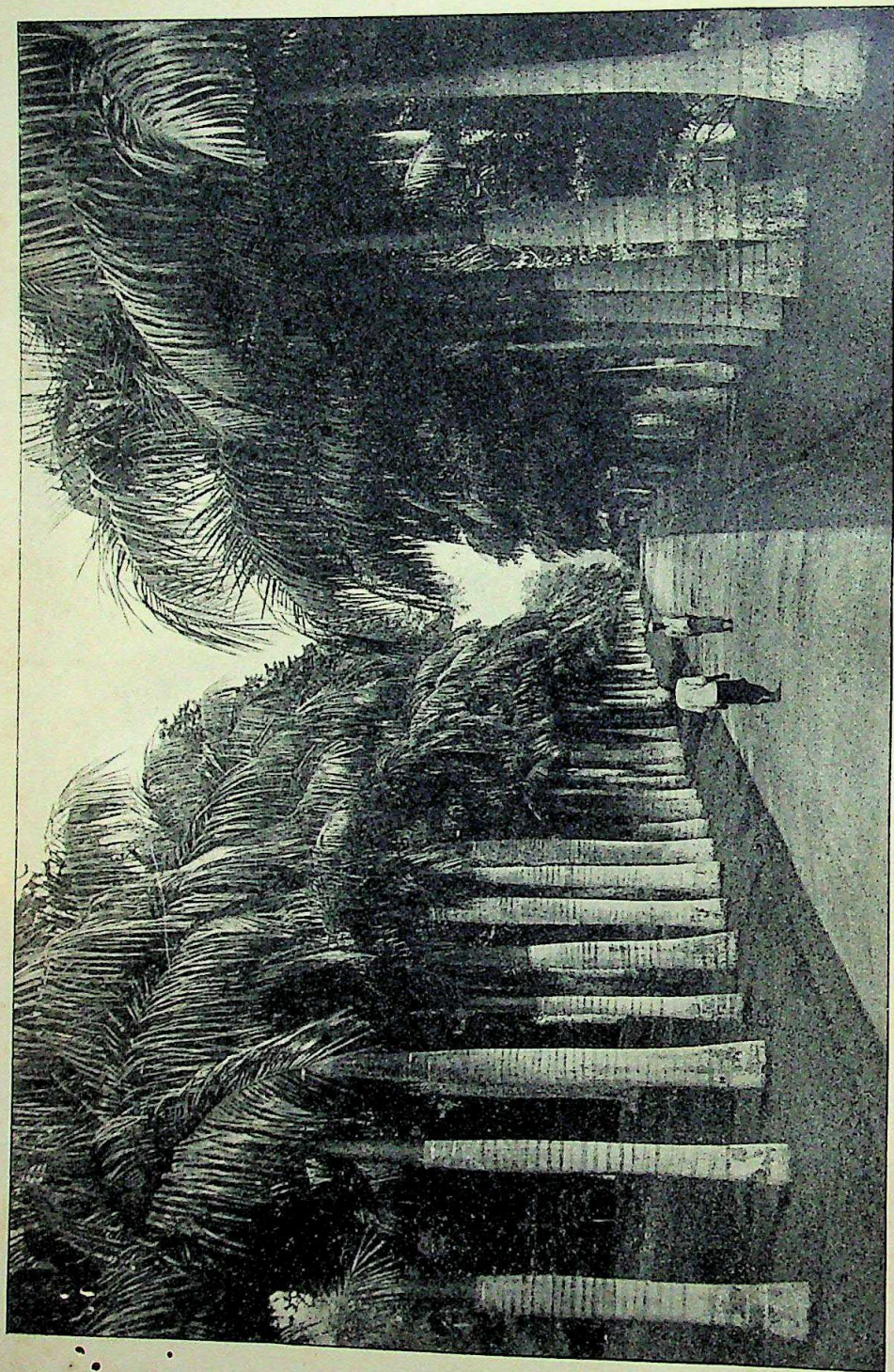
(From the Greek "Oros," the mountain, and "doxa" glory; alluding to the lofty stature of some of the species.)

Mart. Hist. Nat. Palm, III, 166, 310, t. 156, 163.—Jacq., Stirp. Sel. t. 170—Kunth. Enum. Pl. III, 181.—Walp. Ann. III, 459.—Griseb. Fl. Brit. W. Ind. 517.—Benth. & Hook. Gen. Pl. III, II, 899, 35.









YOUNG AVENUE OF CABBAGE PALMS in the Botanic Garden of Peradeniya (*Oreodoxa oleracea*, Mart.).



*ROYSTONEA*.—O. F. Cook in Bull. Torrey bot. Club, 1901, p. 549.

Stem erect, columnar, unarmed, annulate, thickened at the base or in the middle, leaves terminal, pinnate; pinnae narrow-lanceolate, bifid at the top; petiole long-sheathing.

Spadix at the base of cylinder formed by the leaf-sheaths, thrice-twice divided, equalling the inner lignescent spathe. Flower monoecious, small, white or yellowish. Male calyx 3—phyllous, short, imbricate; petals 3; stamens 6-12, long-exserted with versatile anthers. Female calyx as in the male; petals 3, valvate; staminodes forming a 6-dentate cupule; ovary 3-locular; stigmas 3, sessile, suprabasilar in the fruit.

Berry drupaceous, 1-seeded; putamen adnate to the testa; albumen uniform; embryo basilar.

Species 4.—Tropical America: Antilles and neighbouring coast of South America.

CULTIVATION IN EUROPE.—These palms are elegant stove plants and are easily raised from imported seeds, sown in a sandy soil in a mild hotbed. When the seedlings have attained sufficient size they must be potted off singly into small pots with the same kind of soil in which the seeds were sown. Later on, good turfy loam will be better.

*OREODOXA OLERACEA*, Mart. Hist. Nat. Palm. III, 166, t. 156 fig. 1, 2, t. 163.—Becc. Relig. Scheff. in Ann. Jard. bot. Buit. II, 150, t. 12; Palms indg. to Cuba in Pomona Journ. Econ. Bot. II, (1912) 265.—Drude, in Mart. Fl. Bras. III, II, 474.

NAMES.—The tree is called:

American Cabbage Palm, Barbados Cabbage tree; Cabbage Palm, Cabbage tree (English).

Arbre au chou, Arbre chou des Barbades, Arec d'Amérique Arec légumineux, Arouari des Caraïbes, Chou palmiste Palmier des entourages, Palmiste blanc, Palmiste à chou, Palmiste à colonne, Palmiste franc (French).

Echte Kohlpalme, Kohlpalme, Kohltragende Arekapalme (German).

Amerikaanische Koolpalm, Koolboom, Koolpalm, Palmiet (Dutch).

The cabbage or heart of the tree is called:

Chou palmiste (French).

Palmenkohl Palmkohl (German).

Palmkool (Dutch).

DESCRIPTION.—Stem more or less thickened at the base, for the rest equal, 100-130 feet high, annulate. Leaves terminal, up to 20 feet long, patent, forming a graceful crown, pinnatisect; base



sheathing; sheath cylindric, slightly attenuate upwards, about 1 foot in diameter, dark green; peduncle 4 inches broad above the sheath, and 20-25 inches long, semi-cylindric and deeply canaliculate with acute margins; rhachis convex below, excavate on the upper side; segments about 200 on each side with a thickened pulvinus at the base, the lowest and uppermost almost equidistant, the middle ones slightly crowded, 3 feet long,  $1\frac{1}{2}$  inches broad, lanceolate-linear, acuminate, bright green, slightly glaucescens on the lower surface.

Spadix rising at the base of the cylinder formed by the leaf-sheaths,  $2\frac{1}{2}$ -3 feet long, decompose. Inner spathe cylindric, attenuate at both ends, cuspidate, lignescent, opening longitudinally on the ventral side; peduncle almost 1 inch in diameter, slightly thickened at the point of branching; branches furfuraceous-puberulous. Flowers crowded, 3 together, the middle one female; bract at the base of the female flower small, membranous, triangular subulate, persistent; bracteoles 2, minute, broadly-triangular. Male flowers: sepals minute, scarcely 1 line long, broadly cordate-triangular, imbricate; corolla  $2\frac{1}{2}$  lines long; petals oblong-lanceolate, acute, straw-coloured, valvate; stamens 6, more than 1 line long; anthers linear, bifid at the base, pistillode minute, subtriquetrous. Female flowers half the size of the male flowers; calyx 3-phyllous sepals orbicular-ovate, obtuse, imbricate; petals ovate-subtriangular, slightly concave, valvate; staminodes forming a six-dentate cupule; ovary ovate; stigmas 3, sessile.

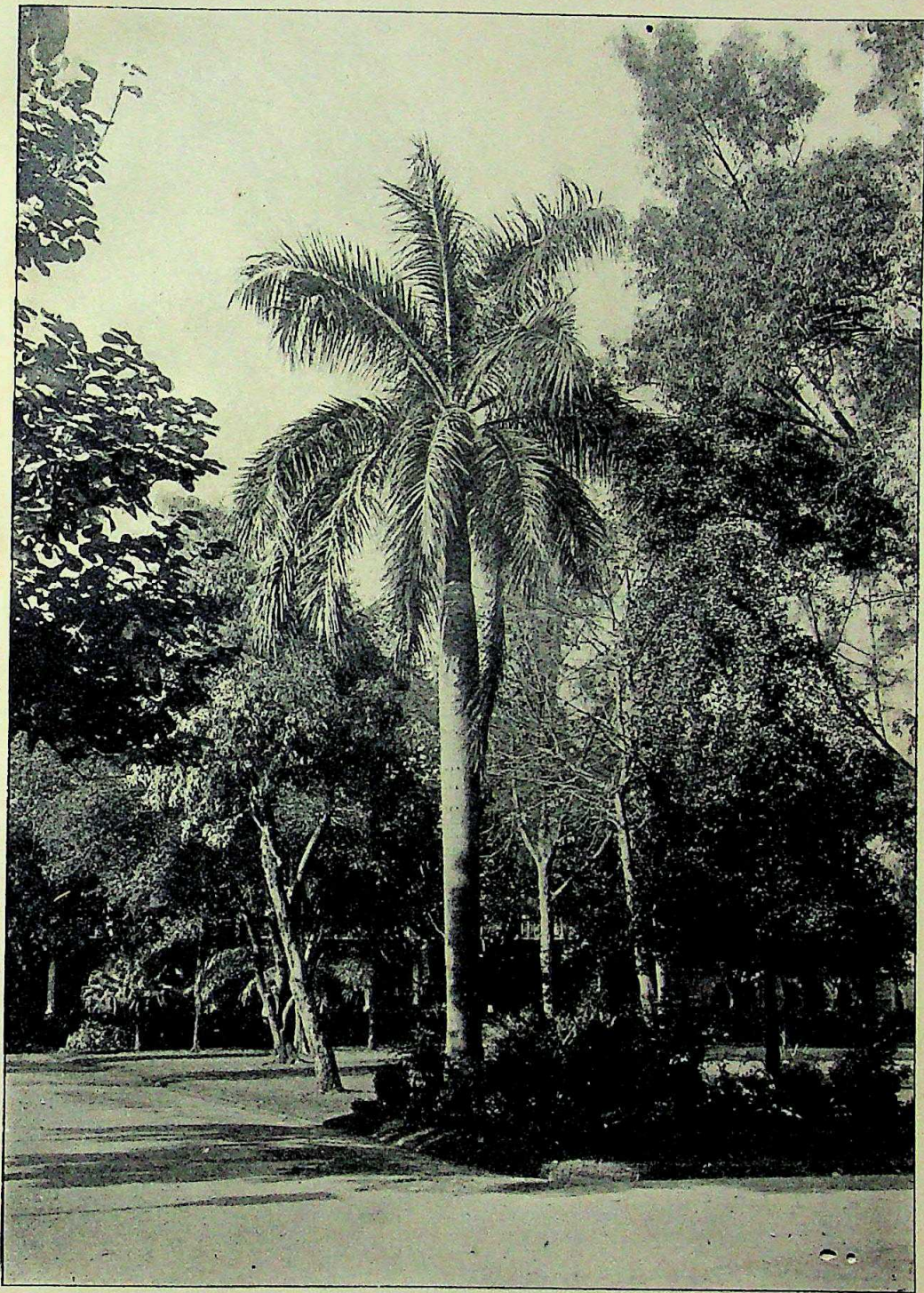
Fruit a berry, incurved, obovoid-oblong, 8-9 lines long; fibres of the mesocarp in an oval area. Seed oblong, 4-5 lines long; albumen horny. Embryo cylindric, basilar.

HABITAT.—Bahamas; Jamaica, common in the mountains, Trinidad, Cuba, and other Antilles.

USES.—The "heart" is made into pickles, or when boiled is served at table. The trunks serve as gutterings. The pith furnishes a kind of sago, and the nuts yield oil by decoction. The wood is very hard, but so thin that it is only fit for walking-sticks or ramrods. The leaf-sheaths, after falling off, are woody like deal. When the leaves are cut off green, the inside skin of the sheaths, if dried, looks like vellum; this bears ink very well on one side, on the other it seems greasy. Twenty large sheaths may be procured from one trunk. In their native country the broad part of the footstalks forms a hollow trough or cradle for children; when cut up it makes excellent splints for fractures.

ILLUSTRATION.—The magnificent avenue of Cabbage palms (*Oreodoxa oleracea*), pictured on plate LXI, was photographed by Mr. Macmillan in the Botanic Gardens of Peradeniya. The stems





MOUNTAIN GLORY. (*Oreodoxa regia*, Kth.).







on the right are more characteristic of this species than some on the left as they do not show that thickening about the middle so peculiar to *Oreodoxa regia*.

*OREODOXA REGIA*.—Kunth in Humb. et Bonpl. Nova Gen. et Spec. Pl. I. p. 244.—Mart.; Hist. Nat. Palm. III, 168, t. 156, f. III, IV, V.—Grisob.; Cat. Pl. Cub. 222.—Sauvage; Fl. Cub. 153.—Combs; in Trans. Acad. St. Louis, VII (1897) 471, t. II.—Sargent; Silva N. A., X, 31, t. DV.—Hemsley; in Biol. Centr. Amer. Bot. 401.—Becc.; Palms. indig. to Cuba, in Pomona College Journ. Econ. Bot. II (1912) 257.—*Oreodoxa oleracea* (non Mart.) Griseb Pl. Wright. 531, and Pl. Cub.: Wright. n. 1467.—*Roystonea regia* O. F. Cook, in Bull. Torrey bot. Club, 1901, p. 531.

Names :—English : Royal Palm, Mountain Glory.

French : Chou franc, Chou palmiste de montagne.

German : Koenigspalme

Dutch : Koningspalm, Palmiet.

In Cuba Palma real.

DESCRIPTION<sup>1</sup>.—Stem generally more or less thickened at the middle, but sometimes almost regularly cylindrical from the base nearly to the summit, unarmed, annulate, 40-60 feet high. Leaves very large; leaf sheath elongate, tightly enveloping the vegetative cone. Leaflets alternately inserted in contrary ways along the rachis, standing in four different planes, at least in its lower and intermediate part, but more regularly set and almost in one plane towards the end. Rachis at first more or less sprinkled with small, appressed, orbicular, tobacco-coloured, deciduous scales, but becoming glabrous by age. Leaflets firmly papyraceous, ensiform, quite straight and very gradually narrow above from below the middle, to a very acuminate, rather rigid, briefly bifid apex, generally more deeply split by age, attached to the rachis by a narrow base, having here the margins strongly reduplicate, green on both surfaces, on the lower rather densely sprinkled with very numerous, very small dots visible under a strong lens; midrib strong, very prominent above, covered below by an almost continuous line of elongate chaffy scales; secondary nerves 2-3 on each side of the midrib; tertiary nerves very numerous and not very prominent; margins acute, not or very slightly thickened; transverse veinlets obsolete. Intermediate leaflets  $2\frac{1}{2}$  to  $3\frac{1}{2}$  feet long and  $1\frac{2}{5}$  to  $1\frac{3}{5}$  inch broad.

Spathes 2, the exterior one tubular, pervious at its upper end, considerably shorter than the interior one, which completely envelops the spadix before the anthesis, and is at that time flattened-fusiform and biconvex, later deciduous. Cf. figure 30.—Spadices 3-4 at the

(1). We follow almost word for word the description given by Beccari, l. c.



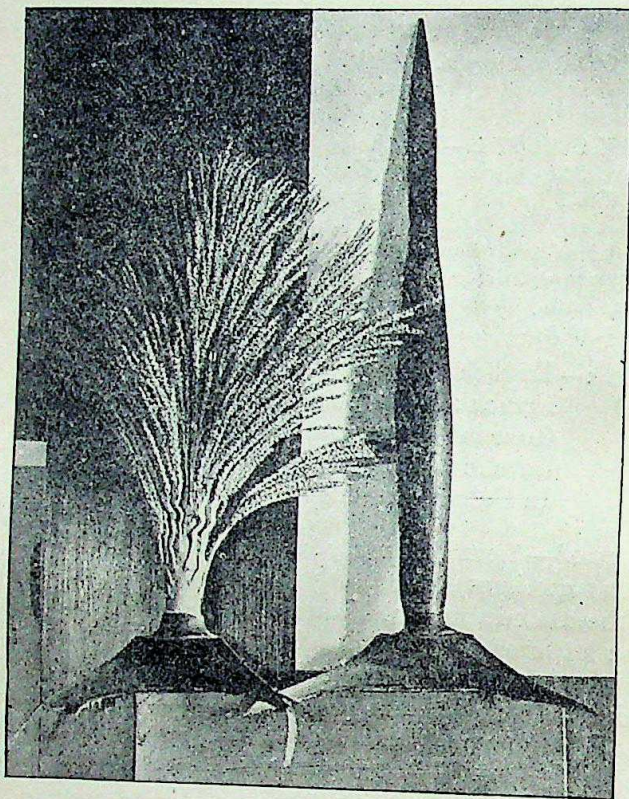


FIG. 30.—To the right: Spadix of *Oreodoxa regia* enclosed in the spathes.  
To the left: The same spadix after removal of the spathes.

same time, erect when not yet open, at the base of the lowest leaf sheath, spreading when in flower, with a very short, broad peduncular base, twice branched; primary branches conspicuously swollen at their bases and divided into several alternate flowering branchlets, which are slender, terete,  $\frac{3}{6}$  to  $\frac{5}{6}$  foot long or shorter, more or less sinuous between the flowers.—Flowers light coloured, ternate almost to the end of the branchlets, inserted on very superficial flat orbicular pulvinuli. Male flowers considerably larger than the female, irregularly ovoid, obtuse,  $\frac{1}{5}$  to  $\frac{1}{4}$  inch long; calyx very small, with slightly imbricate, scarious, subpellucid, subdeltoid, obtuse or acute, and more or less carinate sepals; petals considerably longer than the sepals, concave, thinly pergamentaceous, irregularly ovate-oblong or oblong-elliptical, bluntish or subacute, striately veined, with a nectariferous swelling inside at the base. Stamens usually 6-7, occasionally 8-9, about as long as the petals, also during the anthesis, about  $\frac{1}{5}$  inch long on



the whole; anthers relatively large, erect when in the bud, slightly shorter than the filaments, ovate-elliptical or ovate-sagittate, obtuse, the cells united by a broad conspicuous connective, dark coloured in the dry state, inserted on the filament about their middle; filaments  $\frac{1}{6}$  inch long, linear subulate at the apex, somewhat flattened; rudimentary ovary globose, with 3 short, acute, stigmatic points.—Female flowers open a short time after the male, horizontal,  $\frac{1}{6}$  inch long when full grown, but not yet open, broadly conical and apiculate; sepals reniform, entire, smooth, slightly callous at the base; corolla four times as long as the calyx, urceolate-campanulate when open, divided down to a little below the middle into three triangular briefly acuminate valvate divisions; staminodes forming a cup, lining the undivided part of the corolla, and crowned by 6 obtuse lobes, 3 of them peeping forth between the divisions of the corolla. Ovary globose, usually unicellular, with rudiments of the two other cells, more rarely with two of these perfectly developed, producing then a didynamous fruit; ovule attached along one side of its cell; stigmas fleshy, triangular-subulate, recurved.

Fruit globose-obovoid and somewhat gibbous,  $\frac{1}{2}\frac{1}{4}$  inch long,  $\frac{3}{8}$  inch broad, with a perfectly round top and with the remains of the stigmas placed a little above the base, on the less convex side; pericarp on the whole about  $\frac{1}{24}$  inch thick; epicarp smooth outside, thin and brittle in the dry fruit; mesocarp scanty, softly parenchymatous; endocarp thinly woody and forming a shell or putamen to the seed, its inner wall remaining adherent to and almost connected with a large portion of the antiraphal side of the seed, brittle and removeable on the side of the hilum.—Seed broadly ovoid elliptical, rounded at both ends, slightly compressed and flattish on the raphal side, about  $\frac{1}{3}$  inch long and  $\frac{7}{24}$  inch broad; raphal side conspicuously marked by a circular central area in which, a little below the centre, is placed the hilum, whence numerous vascular ramose venations radiate. Albumen homogeneous, very slightly excavate on the raphal side. Embryo obliquely basal, penetrating deeply into the substance of the albumen. Fruiting perianth explanate, not accrescent.

Habitat: Cuba, Jamaica, S. Domingo, St. Croix, Panama (Beccari).

*CALYPTROCALYX*, Bl. Rumphia II, 103, tab. 102.

(From the Greek 'kalyptra', an extinguisher, and 'kalyx,' a calyx, in allusion to the form of the outer perianth segments.)

Kunth. Enum. Pl. III, 642.—Miq. Fl. Ind. Bat. III, 44.—Benth. & Hook. Gen. Pl. III, II, 902, 42 (*partim*).

Stem annulate, unarmed; leaves terminal, pinnatisect, segments reduplicate, linear, acuminate, sometimes bifid at the apex.

Spadix elongate, spicæform, declinate between the bases of the leaves. Spathe longitudinally open, coriaceous, remaining on the



peduncle for a long time. Flowers monœcious in cavities of the rhachis which are covered by a persistent scale, glumaceous, surrounded by bracteoles. Each glomerule consisting of two male flowers (one of which opens several days before the other) and one female which develops a long time after the male flowers. Calyx triphylous, sepals cucullate, narrowly imbricate. Corolla deeply tripartite; segments before opening valvate (according to Blume) but 'segments of female flowers distinctly imbricate' (according to Scheffer). Male flowers: Stamens very numerous; filaments subulate, confluent at the base of the corolla; anthers linear; rudimentary ovary present. Female flowers: Ovary incompletely trilocular; stigma simple, sessile; rudimentary stamens small.

Fruit about  $1\frac{1}{2}$  inches long and  $\frac{1}{2}$ — $\frac{1}{2}$  inch in diameter, crowned by 3 dentiform patent stigmas. Seed globular, about  $\frac{3}{8}$  inch in diameter, often slightly irregular.

SPECIES.—About 5†.

DISTRIBUTION.—Moluccas and New Guinea.

*CALYPTROCALYX SPICATUS*, Bl., Rumph. II, 103, t. 102, D, 118. 161; Miquel Fl. Ind. Bat. III, et de Palm. Arc. Ind. 25; Scheffer in Ann. Jard. Bot. Buit. I, 131; Kunth. Enum. Pl. III, 643; Walpers Ann. III, 468, V, 814; Mart. Hist. Nat. Palm. III, 230, 317; H. Wendl. in Kerch. Palm., p. 238; Becc. in Ann. Jard. Bot. Buit. II, 142.—*Areca spicata* Lam. Enc. Bot. I, 241, No. 2; Willd. Sp. Pl. IV, 595, No. 4; Spreng. Syst. Veg. II, 139, No. 4; Mart. l. c. 179, No. 13.—*Euterpe globosa* Gært. Fruct. I, 24, quoad Rumphii citatum, non quoad fruct. descriptum et t.g. illustratum (fide Mart.)

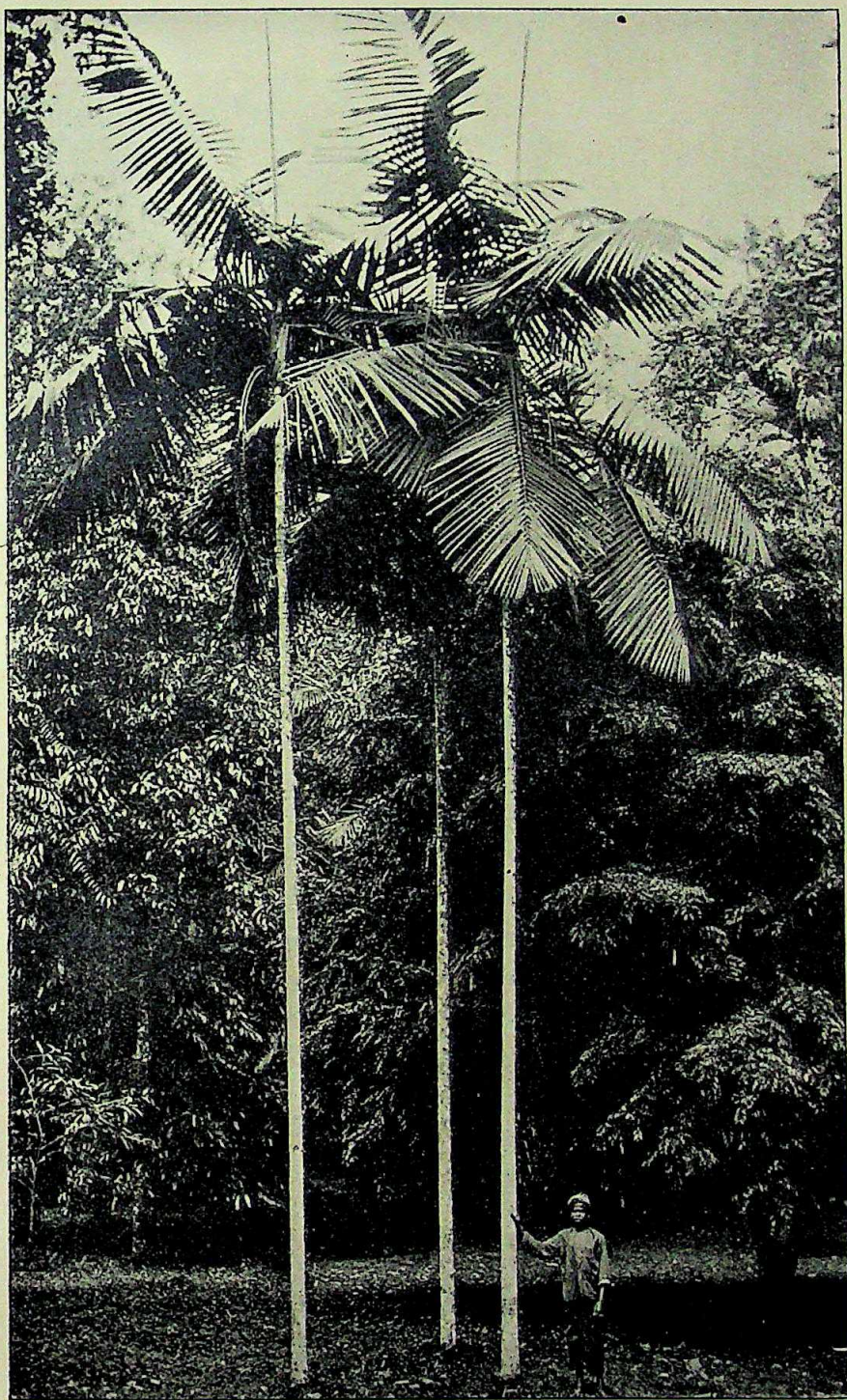
*Pinanga globosa* Rumph. Herb. Amb. I, 38, t. 5, f. 1, A.

NAMES.—Nibung, Pinang utan, bezaar (Malay.); Hua niwel, Hua ewan (Amboina); Hena Hena (Ternate) (ex Blume l. c.), Ährige Haubenkelch-Palme (German).

DESCRIPTION.—Stem erect, cylindrical, up to 40 feet high, 7-10 inches in diameter, annulate, scars subequidistant. Leaves many, the lower ones spreading, 8-12 feet long, oblong in outline, divided into narrow segments; petiolar sheath elongate-cylindric, narrow, coriaceous, furfuraceous with minute fuscous scales; petiole short, convex on the dorsal side; rhachis triquetrous. Segments numerous, obliquely adnate by means of callosities, subalternately arranged, linear, very acuminate, entire or divided at the apex into two short unequal teeth, longitudinally plicate, the median lateral ones elongate, 2-2½ feet long, 2-2½ inches broad, the lower ones narrower and shorter, subreclinate, the upper ones gradually more approximate, much narrower than the median ones and not reaching more than 15 inches at the apex.

† The four species not mentioned here (*C. Albertianus*, Becc., *C. leptostachys* Becc., *C. pachystachys*, Becc., *C. laxiflorus*, Becc.) have been described by Beccari in Webbia I, (1905) 305-313.





*Calyptrocalyx spicatus*, Bl., in the Botanic Garden of Peradeniya.







Spadices arising from between the leaves, solitary, first oblique, then declinate, elongate, cylindrical, spiciform, rigid, virescent, much longer than the spathe; peduncle  $1\frac{1}{2}$ -2 feet long, compressed-terete, arcuate with scattered ferruginous scales; rhachis reaching 5-7 feet, about one inch thick, attenuate towards the base, sub-angular. Spathe almost as long as the peduncle, narrowly lanceolate, above longitudinally split, coriaceous, rigid, glabrous on the inner side, on the outer striate, obsoletely ferrugineo-punctate.

Flowers monoecious, unisexual, 3 together in cavities (2 male and 1 female). First, one lateral male flower develops; when this has fallen, a second male flower on the other side of the central female flower opens, and when the second male flower has disappeared, the female flower begins to open. There are, therefore, never 3 open flowers in one glomerule at the same time.

Calyx: Sepals 3, excavate, galeiform, slightly unequal, narrowly imbricate. Corolla turbinate, obsoletely triquetrous, deeply tripartite, slightly fleshy at the base, segments ovate, subacute, sometimes somewhat oblique, plano-convex on the outer side, on the inner concave and striate by the pressure of the stamens.

Male flowers: fertile stamens about 160, not much shorter than the corolla, glabrous, unequal, the outermost and innermost ones being shorter than those between them, all inserted at the base of the corolla on a nectariferous disc; filaments straight, subulate; anthers linear, as long as the filaments, attached on the middle of the back, slightly retuse at the apex, at the base deeply bifid; rudimentary ovary  $\frac{1}{2}$  inch long with 3 patent stigmatic points. Female flowers: ovary ovoid or subconical, slightly attenuate at the apex, usually oblique at the base, subtriquetrous or variously flattened, strigose, at the base incompletely trilocular, uniovulate; stigma sessile, terminal, simple, obsolete. Rudimentary stamens present.

Fruit mucronate at the apex; endocarp thick-fibrous, crustaceous, orange coloured or red, 1-seeded. Seed free, oval or almost round.

DISTRIBUTION.—Amboina (Rumphius, Zippel); Ternate, Halmaheira (Miquel).

ILLUSTRATION.—Plate LXIII. Three specimens of *Calypptocalyx spicatus*, photographed by Mr. Macmillan in the Botanic Gardens of Peradeniya. The rings on the stems, otherwise distinctly visible, are covered in our specimens by a thick growth of lichens.

(To be continued.)



NOTE ON THE GENUS *LEGGADA*.

BY

OLDFIELD THOMAS.

In Part III of the "Scientific Results of the Mammal Survey,"\* Mr. Wroughton and Miss Ryley have, at my instigation, accepted the species *platythrix* as the type of *Leggada*, on the ground of tautonymy, that species having according to Elliot the native name of "Leggyade." From this acceptance it followed that the *platythrix* group, with frontal ridges, would bear the name *Leggada*, and that *booduga* and its allies, including all the African species referred to *Leggada*, would fall into *Mus*.

But it has been suggested to me by Mr. Miller that I have in this case overstrained the admirable principle of tautonymy, and on re-investigating the question I am prepared to agree with him. The genus was undoubtedly primarily founded on *L. booduga*, though *platythrix* was mentioned, and the selection of the former species as the type was confirmed in my paper on Indian Rats and Mice in 1881.† Apart from tautonymy therefore, *platythrix* could not be selected by Wroughton and Ryley in 1913 as "first revisers," that position having being taken by me in 1881, even if any selection of a genotype was needed after Gray first founded the genus.

As a result, *booduga* being now considered a member of true *Mus*, the name *Leggada* will have to be sunk as a synonym of that genus, while the group of which *platythrix* is the type will need a new name.

This I would suggest should be *Leggadilla*, technically different from *Leggada*, but like enough to it to recall a name familiar to most Indian naturalists. No confusion between the two can arise, as *Leggada* itself now disappears from our lists as being synonymous with *Mus*.

The genotype of *Leggadilla* would be *L. platythrix* (*Mus platythrix*, Benn.) and there would belong to it the six species enumerated under *Leggada* in Wroughton and Ryley's paper.

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\* Journ. Bomb. Nat. Hist. Soc., XXII, p. 16, 1913.

† P. Z. S. 1881, p. 552.



## A NEW SORICULUS FROM THE MISHMI HILLS.

BY OLDFIELD THOMAS.

*(Published by permission of the Trustees of the British Museum.)*

I owe to the kindness of Mr. Kinnear the opportunity of examining two small mammals, a squirrel and a shrew, obtained by Capt. F. M. Bailey in the Mishmi Hills, and sent by him to the Bombay Natural History Society. The squirrel is referable to *Dremomys lokriah*, Hodgs., but the shrew appears to be new, and may be called

## SORICULUS BAILEYI, sp. n.

Allied to *S. caudatus*, Horsf., and *sacratu*s, Thos., but markedly larger than either.

Size approaching that of *S. nigrescens*, but proportions as in *caudatus*. Fur long, rich and fine, hairs of back about 7 mm. in length. Colour dark slaty-grey washed with blackish, much as in *sacratu*s, blacker than in *caudatus*. Undersurface drabby brown—near “hair-brown” of Ridgway. Feet brown, the digits white. Tail slightly longer than head and body, black above and laterally, whitish along a narrow line below, the tip slightly tufted.

Skull of type imperfect, the tooth-rows alone preserved. Upper tooth row much longer than in the allied species, but falling short of that of *S. nigrescens*. Unicuspid proportionally large, more extended longitudinally and less transversely than usual; owing to this, although the upper tooth row is as a whole shorter than in *S. nigrescens*, the combined length of the unicuspid is distinctly greater; three main unicuspid subequal in horizontal area, evenly decreasing backwards in lateral view; all of them large in proportion to the general size of the animal, especially the anterior one, which is larger than in any other member of the genus.

*Dimensions of type*, measured by the collector in the flesh:—

Head and body 70 mm.; tail 76; hindfoot 16.4.

Skull, upper tooth row from front of  $i^1$  to back of  $m^3$  9.6; front of  $i^1$  to front of  $p^1$  4.3; combined length of three large unicuspid 2.7; height of first unicuspid 1.2; combined length of  $p^1$ ,  $m^1$  and  $m^2$  5. Lower jaw, back of condyle to tip of  $i^1$  14.1.

*Hab.*—Mishmi Hills. Type from the Tsu River. Alt. 7,500'.

*Type.*—Adult, sex unknown. B. M. No. 14.1.1.1, collected 15th March 1913 by Captain F. M. Bailey. Presented by him to the British Museum through the Bombay Natural History Society.

This well marked species belongs to the group in which the tail is about equal to or slightly longer than the head and body. From the two other species of the group, *S. caudatus* and *sacratu*s, it differs by its larger size, and, as from every other species of the genus, by its large anterior unicuspid.



# BOMBAY NATURAL HISTORY SOCIETY'S MAMMAL SURVEY OF INDIA, BURMA AND CEYLON.

REPORT No. 12.

BY K. V. RYLEY.

*With Field Notes by the Collector, C. A. Crump.*

COLLECTION	...	...	...	No. 12.
LOCALITY	...	...	...	PALANPUR AND MOUNT ABU.
DATE	...	...	...	MARCH-JULY 1913.
COLLECTED BY	...	...	...	MR. C. A. CRUMP.
EARLIER REPORTS	...	...	...	No. 1, E. Khandesh, Vol. XXI, p. 392, 1912; No. 2, Berars, Vol. XXI, p. 820, 1912; No. 3, Cutch, Vol. XXI, p. 826, 1912; No. 4, Nimar, Vol. XXI, p. 844, 1912; No. 5, Dharwar, Vol. XXI, p. 1170, 1912; No. 6, Kanara, Vol. XXII, p. 29, 1913; No. 7, Central Provinces, Vol. XXII, p. 45, 1913; No. 8, Bellary, Vol. XXII, p. 58, 1913; No. 9, Mysore, Vol. XXII, 283, 1913; No. 10, Kathiawar, Vol. XXII, p. 464, 1913; No. 11, Coorg, Vol. XXII, p. 486, 1913.

This collection was made partly in the sandy open country in the vicinity of Palanpur and Deesa, partly at Mount Abu, just over the boundary in Rajputana, while the last camp was at Danta, Mahi Kantha.

The following notes on the actual collecting stations are given by Mr. C. A. Crump:—

*Palanpur, Gujerat.*—“While collecting in this State I received assistance in many ways from Col. W. Merewether, Political Agent and from Nawabzada Mahomed. During my stay in Deesa Cantonment I was fortunate in having the co-operation of Capt. L. S. Fenton, the Cantonment Magistrate, who secured for me many specimens which otherwise I could not have obtained.

The area collected over is a slightly undulating alluvial plain of which the soil is very light with considerable areas of fine yellow sand. The elevated and flat portions of the plain are sparsely vegetated, cactus and babul being most in evidence. In the depressions a good deal of irrigated cultivation is carried on and large trees are numerous. Banas River, rising near the Abu Range flows through the State in a south-westerly direction.

*Palanpur.*—Slightly undulating soil, very light. Collection made on the outskirts of the town. With the exception of the desert Gerbils, bats, house-rats and mice, the specimens were obtained from the cultivation irrigated by wells.

*Jamwa.*—More undulating than Palanpur, otherwise similar. No water except from wells.

*Deesa.*—One of the features of Deesa is the Banas River, now nearly dry, but containing an abundance of grasses and rushes which afford an excellent cover for animals. The Cantonment is



well planted with trees, otherwise the surrounding country is similar to the last two. Thanks are due to Lt.-Col. C. J. Windham, the Resident, for assistance when I was at Mount Abu.

*Sirohi* is situated in the S. W. of Rajputana between the parallels of  $24^{\circ}$ - $20'$  and  $25^{\circ}$ - $17'$  N. latitude and  $72^{\circ}$ - $16'$  and  $73^{\circ}$ - $10'$  E. longitude; it has an area of 1,964 square miles. It is bounded on the N. E., N. and W. by Jodhpur; on the S. by Palanpur and Danta; on the S. E. by Idar and on the E. by Udaipur. The country is much broken up by hills and rocky ranges. The main feature is the almost isolated mountain of Abu, the highest peak of which, Guru Sikhar, rises 5,650 feet above sea-level.

The whole of *Sirohi* is occupied by schists and gneisses belonging to the Aravalli system traversed by dykes of granite. Mount Abu is formed of a highly felspathic, massive and crystal line gneiss with a few schistose beds. On the slopes and round the base of Abu the forests contain a great variety of trees and shrubs. Among the most common are the bamboo (*Dendrocalamus strictus*), the mango (*Mangifera indica*), two or three species of Ahao (*Anogeissus latifolia* and *pendula*, etc.), the bel (*Ægle marmelos*), the haldu (*Adina cordifolia*), the siris (*Albizia lebbek*), the jamun (*Eugenia jambolana*), the kachnar (*Bauhinia purpurea*), the timru (*Diospyros tomentosa*), the semal (*Bombax malabaricum*), the dhaman (*Grewia oppositifolia*), the rohira (*Tecoma undulata*), the phaludra (*Erythrina arborescens*), the aonla (*Phyllanthus emblica*) and the horse-radish tree (*Moringa concanensis*).

"The annual rainfall at Abu averages between 57 and 58 inches. Abu is 3,800 feet above sea-level."

(The above information was extracted from the Gazetteer).

Almost all the collection in this neighbourhood was made at Uria, a small village about 5 miles to the N. E. of Abu at an altitude of a little over 4,000 feet above sea-level, and situated almost at the top of a pass lying close to the western slope of the Guru Sikhar Mountain. Large trees are not numerous, but are dotted about among the low jungle which forms the principal cover and is in places more or less dense, but always broken up into clumps by rocks or grassy glades. The soil resembles clay and is very firm. Cultivation is scant, a little wheat, barley and bajri being grown. The immense granite rocks are much eaten away on the under-surface, to such an extent in individual cases that it is no uncommon sight to find rocks resembling gigantic mushrooms and arches of fantastic design.

Some distance below my camp was a small stream running for a short distance and then again disappearing; this was the only surface water I could find. I watched this stream assiduously and found that surprisingly few animals drank there. Undoubtedly a



great many of the larger mammals are partially migratory on the mountain, moving up or down as the supply of food and water sends them. This is particularly noticeable with regard to pigs, which during the cold weather uproot, even the bungalow compound; but during my stay of nearly four weeks I saw no pigs and not the slightest indication of their existence.

*Danta, Mahi Kantha, Gujerat.*—This is a small State lying to the East of Palanpur. The range of hills, part of which cover nearly the whole of this State, almost connects with the Abu Mountains. The annual rainfall averages about 40 inches, although I understand 60 inches have been usual of late. The collection was made on the outskirts of Danta town which is about 20 miles East of Palanpur. While in Danta State I was hospitably received by the Maharajah who also rendered valuable assistance.

Danta lies almost in a circle of hills composed mostly of granite with some more recent formations of limestone. The hills are generally well clad with trees and bushes, but large trees, such as the Fig, Mango, Pipal, etc., are generally confined to the wide open valley where Teak also flourishes in large patches. The soil is a firm yellow sand, inclining to a reddish colour, and is not very fertile. The Monsoon crops consist principally of Jowari, Bajri and Maize; a cold weather crop of wheat is also produced. An endeavour was made to introduce cotton but without success. During the hot weather all the tanks become dry and water is obtained only from wells. The nearest surface water I could find was a spring, two miles from Danta; there was also a second spring not less than three miles distant, I visited both of these but found tracks of animals surprisingly scarce; this rarity of the larger mammals existed everywhere in the vicinity of Danta, and the lack of water must be partly responsible for this state of things, for, otherwise, the jungle is favourable for holding animals in large numbers. I paid particular attention to a tank partly filled by recent rains, on one occasion watching from sunset to sunrise; only one hare, one porcupine and one civet (*Paradoxurus niger*) were observed, I also noticed tracks of pigs of the previous day. The Cutch Rock Rat and most of the Spiney Mice were obtained on the hills but all other Rats and Mice appeared to be confined to the valley. The line separating these is abruptly defined; *Meriones hurriannæ*, *Epimys rufescens* and *Mus booduga* may be taken right up to the base of the hills while twenty feet higher up among the rocks only *Oremnomys cutchicus* and *Leggada sadhu* and *phillipsi* can be obtained. A few specimens of spiney mice were taken in the valley in hedgerows but they were rare.

Ants swarm here to such an extent that I lost more than half of the rats and mice caught in traps, even specimens taken out of the traps at 10 p. m. were ruined.



The following species were not obtained :—

*Simia rhesus*. Not found in the neighbourhood of Palanpur.

*Felis leo*. According to the Gazetteer: "In olden days lions were sometimes met with in the south, but they have not been heard of since 1872, when a full grown female was shot on the Anadra side of Abu by a Bhil skikari".

*Felis tigris*. Occurs in the State of Palanpur; it is now rare about Mount Abu and Danta but is sometimes shot at the latter place.

*Felis pardus*. Found in Palanpur, particularly near hills; it is not common near Abu; but is found among the hills round Danta where it was common. A panther here frequently kills buffaloes.

*Felis caracal*. This cat has been obtained at Abu.

*Felis ornata*. Captain L.S. Fenton had a skin obtained locally.

*Paradoxurus niger*. Could not hear of this species round Palanpur, but it has been obtained at Abu. Although seen by moonlight, I am certain that this was the species I observed near the tank at Danta.

*Hyæna hyæna*. Rather rare in the places I visited in Palanpur; in Lunwa a dead cow was left untouched for several nights. Rare at Uria and not very common at Danta; I have seen a few tracks at the latter place.

*Vulpes leucopus*. Found near Deesa, I did not see one.

*Melursus ursinus* occurs at Abu, no sign of it at Uria now. Moderately plentiful at Danta.

*Boselaphus tragocamelus*. Common; is sacred.

*Tetracerus quadricornis*. Said to occur round Danta.

*Gazella bennetti*. Common in the valley between Danta and Palanpur.

*Muntiacus vaginalis*. I did not hear this species barking, but was informed that it was found in these jungles around Danta.

*Rusa unicolor* and *Axis axis*. Both found at Danta.

*Tragulus meminna*. Unknown.

Large squirrels. Unknown.

Otters are found near Deesa in the Banas River, but I failed to obtain a specimen.

Bats were difficult to find at Abu; there were so many hiding places and crevices in the rocks. They were not numerous round Danta; observed in greater numbers when the heavy rains commenced."—C. A. C.

The collection consists of 802 specimens made up of 45 species in 34 genera. Rodents very largely predominate, there being some fine series of rats and mice—*Cremnomys*, *Meriones*, *Golunda*, etc., being especially well represented. The fauna is typically of the desert variety and new subspecific names have been given to



these desert representatives of *Mungos mungo* and *Millardtia mellada*, and Blanford's name of *watsoni* has been revived to separate sub-specifically the yellow variety of *Golunda ellioti*; these three northern forms are all conspicuously lighter and paler in colour than those from further south. Palanpur has also produced a new subspecies of *Mungos auropunctatus* and of *Vandeleuria oleracea*; a description of these new varieties will be found under "the Scientific Results of the Survey." This is the first time that *Gerbillus gleadowi* has been obtained during the Survey. One more specimen of *Hipposideros brachyotis* has been taken; this is evidently an uncommon bat, as only one has previously come in. It is satisfactory receiving a series of nine *Leggada phillipsi*, which was described from the Berars, as only three specimens were collected before. In the *Mus booduga* group the Palanpur series are of the typical drab colour characteristic of the *Mus dunni*, while those from the more wooded country round Danta agree better with the usual variety of *M. booduga*, and in the case of *Cremnomys culchicus*, *Tatera indica* and *Meriones hurriannae* the Danta examples are all of a richer deeper shade than the desert specimens.

PRESEYTIS ENTELLUS, Dufr.

*The Langur.*

(Synonymy in No. 1.)

♂ 3171. ♀ 3172. Deesa, Gujerat.

(See also Reports Nos. 1, 2, 4, 7, 10 and 11.)

"Plentiful in and near the town of Palanpur, where it may be seen frequenting house-tops and verandahs. Held sacred by the Hindoos.

Observed at Uria, though not in great numbers; they appeared similar to those obtained near Palanpur.

Fairly common at Danta."—C. A. C.

PTEROPUS GIGANTEUS, Bruenn.

*The Common Flying Fox.*

(Synonymy in No. 2.)

6 ♂ ♂. Deesa, Gujerat.

5 ♂ ♂. (One skull only). Danta, Mahi Kantha.

(See also Reports Nos. 2, 3, 4, 5, 7, 8, 9, and 10.)

A large fruit bat, having a head and body measurement of about 10½ inches. Dark-brown and grey fur on the back with an orange coloured band across the neck and shoulders; dark-red brown on the under-side. Weight about 1 lb. 5 ozs. Those from Deesa are decidedly paler in colour than any specimens previously received.

"Common. In Deesa, the colony appeared to consist entirely of males. A small colony about 8 miles from Danta used occasionally to come in to Danta to feed."—C. A. C.

CYNOPTERUS SPHINX GANGETICUS, K. And.

*The Northern Short-nosed Fruit Bat.*

(Synonymy in No. 7.)



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2 ♂♂; 3 ♀♀. Danta, Mahi Kantha, Gujerat.

(See also Reports Nos. 4 and 7.)

A fruit bat about four inches in length, colour brownish olive. This bat is slightly larger than *Cynopterus sphinx*, which is found in Southern India.

LYRODERMA LYRA, Geoff.

*The Indian Vampire Bat.*

(Synonymy in No. 1.)

3 ♂♂. Deesa, Palanpur.

1 ♂. Danta, Mahi Kantha, Gujerat.

(See also Reports Nos. 1, 4, 5, 6, 7, 8 and 9.)

An ashy grey bat with very large ears united on the inner margin for nearly half their length. Nose-leaf high and narrow. Fur rather long and paler on the underside of the animal. Head and body about two inches long. Weight about  $1\frac{1}{2}$  ozs.

HIPPOSIDEROS BRACHYOTUS, Dobs.

*The Dekhan Leaf-nosed Bat.*

(Synonymy in No. 6.)

♀ 3479. Danta, Mahi Kantha, Gujerat.

(See also Report No. 6.)

A small greyish brown bat; fur fairly long and soft, grey at the base and dull brown at the tips, very similar to *H. fulvus* and *dukhunensis* in colour, but is considerably larger than the former and smaller than the latter, and has much smaller ears than either. Head and body nearly two inches, tail extending just beyond the membrane. Fairly complicated nose-leaf. Weight about  $\frac{1}{2}$  oz.

This little bat appears to be rare, as it is only the second specimen obtained during the Survey; the other one was taken in Kanara and is rather darker in colour. The National collection is also badly in want of specimens.

HIPPOSIDEROS FULVUS, Gray.

*The bicoloured Leaf-nosed Bat.*

(Synonymy in No. 3.)

♀ 2832. Palanpur, Gujerat.

(See also Reports Nos. 3, 5, 6, 7, 8, 9, 10 and 11.)

A very small grey-brown bat with large ears. Fur soft and long, white-tipped with brown, dirty white on the underside, tail extending just beyond the membrane; small nose-leaf. Head and body nearly two inches. Weight  $\frac{1}{2}$  oz.

"I observed only a few flying about bungalows. Comes out late."—C. A. C.

PIPISTRELLUS CEYLONICUS, Kel.

*Kelaart's Bat.*

(Synonymy in No. 1.)

2 ♂♂; ♀. Mount Abu, Rajputana.

(See also Reports Nos. 1, 2, 3, 5, 6, 8, 9, 10 and 11.)



## PIPISTRELLUS DORMERI, Dobs.

*Dormer's Bat.*

(Synonymy in No. 1.)

1 ♂; 2 ♀♀. Palanpur, Gujerat.

5 ♂♂; 2 in al. Lunwa, Palanpur.

(See also Reports Nos 1, 2, 3, 5, 7, 8 and 10.)

A small bat varying in colour from greyish-brown to grey; paler on the underside, which sometimes has a yellowish shade. Head and body about two inches long. Weight about  $\frac{1}{4}$  oz.

"Most of these were shot flying high round trees, occasionally caught under trees. Comes out fairly early and is moderately fast on the wing".—C. A. C.

## PIPISTRELLUS MIMUS, Wrought.

*The Southern Dwarf Pipistrelle.*

(Synonymy in No. 1.)

3 ♂♂. Palanpur, Gujerat.

6 ♂♂. 1 in al. Lunwa, Palanpur.

1 ♂. 4 in al. Mount Abu, Rajputana.

(See also Reports Nos. 1, 2, 3, 5, 6, 7, 9, 10 and 11.)

"Fairly common near the town of Palanpur and at Lunwa; very few observed at Deesa. Habitually flies high and is generally the first bat to emerge. In the early evening it is fond of hunting beneath large trees. The usual mode of progression is a slow flutter; a favourite trick of these small bats is to float on the breeze."—C. A. C.

## SCOTOPHILUS KUHLI, Leach.

*The Common Yellow Bat.*

(Synonymy in No. 1.)

3 ♂♂; 10 ♀♀. Palanpur, Gujerat.

1 ♂; 10 ♀♀. 2 in al. Lunwa, Palanpur.

6 ♂♂; 11 ♀♀. 2 in al. Deesa, Palanpur.

2 ♀♀. Danta, Mahi Kantha, Gujerat.

(See also Reports Nos. 1, 3, 5, 6, 7 and 9.)

A brownish yellow bat, with a head and body about three inches long, fairly bright yellow on the underside; has no nose-leaf; tail extends to the end of membrane. It is larger and yellower than *S. wroughtoni*. Weight about 1 oz.

"In vast numbers everywhere. A favourite resort during the day is between ceilings and roofs of houses. Comes out early and has a low, rapid and direct flight, in action somewhat resembling a sandpiper. With the wind it can move at a tremendous pace. At night, the females return frequently to their haunts for the purpose of feeding their young, which soon after birth are not carried by the parent during flight."—C. A. C.

## SCOTOPHILUS WROUGHTONI, Thos.

*Wroughton's Bat.*

(Synonymy in No. 1.)

♀ 2819, ♀. Palanpur, Gujerat.

3 ♂♂; 1 ♀. Lunwa, Palanpur.

(See also Reports Nos. 1, 5, 6, 7, 9, 10 and 11.)



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"Similar in habits to *S. khuli*, but seems content to hunt in a smaller area."—C. A. C.

*TAPHOZOUS LONGIMANUS*, Hardw.

*The Long-armed Sheath-tailed Bat.*

(Synonymy in No. 6.)

5 ♂♂; 11 ♀♀. 5 in al. Lunwa, Palanpur.

(See also Reports Nos. 6, 7, 8 and 9.)

A dark-brown bat, with a head and body measurement of a little over three inches; dark-brown on the underside also; no nose-leaf and the tail perforates the membrane in about the middle and extends free for nearly half an inch.

"Sexes now apart, but frequenting the same fig tree."—C. A. C.

*TAPHOZOUS KACHHENSIS*, Dobs.

*The Cutch Sheath-tailed Bat.*

(Synonymy in No. 1.)

♀ 3112. Deesa, Palanpur.

(See also Reports Nos. 1, 3, 8, 9 and 10.)

A fairly large bat, with a head and body, measuring about five inches; dark-brown fur, which does not extend to the end of the back, where there are large deposits of fat; tail perforates the membrane in the middle and extends free for nearly an inch. Weight about 2 ozs.

"I knew of a colony near Deesa, but after securing one specimen objections were raised."—C. A. C.

*RHINOPOMA HARDWICKII*, Gray.

*The lesser Indian Mouse-tailed Bat.*

(Synonymy in No. 3.)

1 ♂; 3 ♀♀. Palanpur, Gujerat.

1 ♂; 4 ♀♀. 43 in al. Lunwa, Palanpur.

4 ♀♀. 2 in al. Danta, Mahi Kantha, Gujerat.

(See also Reports Nos. 3, 5, 7, 8 and 10.)

A grey brown bat with a long free tail extending about  $2\frac{1}{2}$  inches beyond the membrane. The fur is smooth and thin and does not extend the whole length of the back; no nose-leaf. Weight about  $\frac{1}{2}$  oz.

"A few specimens were shot hovering over lofty trees."—C. A. C.

*NYCTINOMUS TRAGATUS*, Dobs.

*Dobson's Wrinkled-lipped Bat.*

(Synonymy in No. 3.)

♂ 3407; ♀ 3395. Mount Abu, Rajputana.

(See also Reports Nos. 3, 5, 9 and 10.)

A small dark greyish brown bat, nearly three inches in length, having a tail which extends free beyond the membrane for half its length; ears fairly large; fur rather short. Weight about  $\frac{1}{2}$  oz.

"Fairly numerous. After several showers of rain, I saw these bats hunting during the late evening over water, when their speed was terrific."—C. A. C.



## PACHYURA, Sp.

*Shrews.*

- 1 ♂. Palanpur, Gujerat.  
 2 ♂ ♂; 2 ♀ ♀. Lunwa, Palanpur.  
 5 ♂ ♂. Mount Abu, Rajputana.  
 6 ♂ ♂; 3 ♀ ♀. Danta, Mahi Kantha, Gujerat.

(See also Reports Nos. 1, 2, 3, 5, 6, 7, 9, 10 and 11.)

"I should say that shrews are scarce in the neighbourhood of Palanpur; there were but few cases of mice being eaten by shrews. Comparatively rare in the jungle round Mount Abu; my specimens were taken in hedges; and they were not common out of the town at Danta"—C. A. C.

## ERINACEUS MICROPUS, Blyth.

*The Northern Pale Hedgehog.*

(Synonymy in No. 3.)

- 1 ♂. Lunwa, Palanpur.  
 1 ♂; 8 ♀ ♀. Deesa, Palanpur.

(See also Reports Nos. 3 and 10.)

A pale coloured hedgehog. Fur on face and underside mostly white, muzzle and limbs brown. Spines white with a narrow dark-brown band and then white again at the tip. The spines commencing on the forehead are divided by a small bare parting on the tip of the head. Length about 9½ inches. Weight about 10 ozs.

"Both *E. micropus* and *collaris* are common round Palanpur; they hide in bushes and holes in the ground during the day."—C. A. C.

## ERINACEUS COLLARIS, Gray and Hardw.

*Hardwicke's Hedgehog.*

(Synonymy in No. 3.)

- 2 ♂ ♂; 1 ♀. Palanpur, Gujerat.  
 1 ♂; 1 ♀ 3087. Lunwa, Palanpur.  
 4 ♂ ♂; 4 ♀ ♀. Deesa, Palanpur.

(See also Reports No. 3.)

A dark-coloured hedgehog. Fur on face and underside dark-brown. Spines white with black at the terminal end; some have white tips on the flanks, but the general appearance is dark. Length about 10 inches. Weight about 14 ozs.

## FELIS AFFINIS, Gray.

*The Jungle Cat.*

(Synonymy in No. 1.)

- 1 ♂. Lunwa, Palanpur.  
 1 ♂; 1 ♀. Deesa, Palanpur.  
 1 ♂; 2 ♀ ♀. Mount Abu, Rajputana.

(See also Reports Nos. 1, 3, 4, 5, 6, 7, 10 and 11.)

"All natives agree that cats are rare round Palanpur; they are also rare at Uria and Danta."—C. A. C.

## MUNGOS MUNGO PALLENS, Ryl.

*The pale-grey Mongoose.*

1914. *Mungos mungo pallens*, Ryley. Journ., B. N. H. S., Vol. XXII, p 660.



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- 3 ♂ ♂. Lunwa, Palanpur.  
 7 ♂ ♂; 3 ♀ ♀. Mount Abu, Rajputana.  
 2 ♀ ♀. Danta, Mahi Kantha, Gujerat.

A lighter coloured mongoose than the Southern common mongoose; white with brown speckles, pale drab on the underside. Head and body about 15 inches, tail about the same length. Weight 3½ lbs.

"Mongoose not common at Palanpur; in Cutch I saw at least ten to every one observed here. Not found in the immediate vicinity of Deesa, where *M. auropunctatus helvus* takes its place. Very plentiful at Mount Abu; I observed many in the village and in the forest. I saw some half dozen or so at Danta."—C. A. C.

## MUNGOS AUROPUNCTATUS HELVUS, Ryl.

*The small Yellow Mongoose.*

1914. *Mungos auropunctatus helvus*, Ryley. Journ., B. N. H. S., Vol. XXII, p. 661.

- 5 ♂ ♂; 4 ♀ ♀. Deesa, Palanpur.

A small yellow mongoose, minutely speckled with brown; pale yellow feet (which distinguishes it from *M. auropunctatus*); pale drab on the underside. Head and body about 12 inches. Weight about 17 ozs.

"Breeds and sleeps in a hole (undoubtedly dug by itself) in the ground and is diurnal, otherwise differing a good deal in habits from *M. mungo*. It can be bold but generally is rather cautious, keeping near to cover. Its presence may at once be detected by a well-worn tract running the entire length of a hedge. When danger threatens, this mongoose immediately takes cover, and if the hedge is sufficiently dense, it lies up and may be approached to within a few feet, if then conscious of detection it dodges about in the hedge making very little attempt to place distance between itself and pursuer, and is with great difficulty induced to leave the hedge. In contrast to this, *M. mungo* invariably takes the nearest cut to its hole in tree or ground."—C. A. C.

## MUNGOS SMITHI, Gray.

*The ruddy Mongoose.*

(Synonymy in No. 7.)

- 3 ♂ ♂; 1 ♀. Mount Abu, Rajputana.

(See also Report No. 7.)

A grey-brown mongoose speckled with white, giving an iron grey appearance, feet almost black, head and legs shaded with reddish brown. Easily distinguished from the ordinary mongoose by having a black tip to its tail. Head and body about 18 inches; tail about 16 inches. Weight about 4 lbs.

"This species is generally found in thick forest, and owing to its retiring habits is more common than is supposed. Apart from my four specimens which were trapped, I saw only two individuals, one of which disappeared between some rocks as I fired.

Reported to occur at Danta, which is probably correct."—C. A. C.

## VIVERRICULA MALACCENSIS, Gmel.

*The small Indian Civet.*

(Synonymy in No. 3.)



- 1 ♀. Palanpur, Gujerat.  
1 ♀. Danta, Mahi Kantha.

(See also Reports Nos. 3, 5, 7, 10 and 11.)

"Not often observed by the natives round Palanpur; at Mount Abu they seemed familiar with this civet, and at Danta it is well known but always difficult to find. It is supposed to eat the livers of live cattle."—C. A. C.

CANIS INDICUS, Hodgs.

*The Jackal.*

(Synonymy in No. 1 under *C. aureus*.)

- 1 ♂; 1 ♀. Palanpur, Gujerat.  
1 ♂; 1 ♀. Lunwa, Palanpur.  
2 ♂♂; 2 ♀♀. Deesa, Palanpur.

(See also Reports Nos. 1, 3, 4, 5, 6, 7, 9, 10 and 11.)

"Common round Palanpur; not found so high up as Uria; rare in the hot weather at Danta, but after the rain commenced I heard jackals calling."—C. A. C.

VULPES BENGALENSIS, Shaw.

*The common Indian Fox.*

(Synonymy in No. 1.)

- 1 ♂. Palanpur, Gujerat.  
2 ♂♂. Deesa, Palanpur.  
1 ♂. Danta, Mahi Kantha, Gujerat.

(See also Reports Nos. 1, 3, 5, 7 and 10.)

"Common at Palanpur. At Mount Abu I did not see or hear any. Said to be common in the valley between Danta and Palanpur. I heard them also in the hills."—C. A. C.

FUNAMBULUS PENNANTI, Wrought.

*The common 5-striped Squirrel.*

(Synonymy on No. 1.)

- 5 ♂♂; 3 ♀♀. Palanpur, Gujerat.  
5 ♂♂; 1 ♀. Lunwa, Palanpur.  
4 ♂♂; 3 ♀♀. Deesa, Palanpur.  
11 ♂♂; 3 ♀♀. 3297, 3382, 3388. Mount Abu, Rajputana.  
10 ♂♂; 3 ♀♀. Danta, Mahi Kantha, Gujerat.

(See also Reports Nos. 1, 2, 3, 4, 5, 7 and 10.)

A small speckled greyish brown squirrel, with five longitudinal yellowish white stripes down the back and flanks, some are yellower and others greyer in appearance; underside dirty-white or pale-yellow. Distinguished from *F. tristriatus* by being smaller and lighter in colour and having much wider pale stripes.

"Very plentiful everywhere."—C. A. C.

GERBILLUS GLEADOWI, Murray.

*The little Hairy-footed Gerbil.*

1886. *Gerbillus gleadowi*, Murray, A. M. N. H. (5) XVII, p. 245.  
1891. *Gerbillus gleadowi*, Blanf., Mammalia, No. 268.

- 3 ♂♂. Lunwa, Palanpur.



A small reddish fawn gerbil, pure white below. Head and body nearly 4 inches long; tail about  $5\frac{1}{2}$  inches longer, hairs on terminal end of tail; hindfoot about 1 inch. Weight about 1 oz.

"Similar in habits to *Dipodillus nanus* and found on the same ground. When dug out this gerbil displays most marvellous agility getting along with a quick succession of leaps, but not rising high off the ground. I spent a great deal of my own time digging for this species and *Dipodillus nanus*, and though I admit that both are very difficult to find I have no hesitation in saying that they are rare here."—C. A. C.

*DIPODILLUS NANUS*, Blanf.

*The little Gerbil.*

(Synonymy in No. 10.)

4 ♂♂; 4 ♀♀. 2 in al. Lunwa, Palanpur.

(See also Report No. 10.)

A small pale fawn gerbil, white below; tail very long. Head and body about three inches, tail over four inches long and the same colour as the back with longer darker hairs at the end. Weight about  $\frac{1}{2}$  oz.

"I have little to add to the notes on specimens obtained at Muli, Kathiawar. Burrows examined here varied in length and design, but are always found in soft sand and never go to any depth below the surface."—C. A. C.

*TATERA INDICA*, Hardw.

*The Indian Gerbil.*

(Synonymy in No. 1.)

6 ♂♂; 9 ♀♀. Palanpur, Gujerat.

4 ♂♂; 2 ♀♀. Lunwa, Palanpur.

2 ♂♂; 2 ♀♀. Deesa, Palanpur.

1 ♂; 1 ♀. Mount Abu, Rajputana.

7 ♂♂; 3 ♀♀. Danta, Mahi Kantha, Gujerat.

(See also Reports Nos. 1, 2, 3, 5, 6, 7, 8, 9, 10 and 11.)

"Found in large numbers near cultivation in Palanpur. Very scarce at 4,000 feet altitude at Mount Abu. By no means abundant at Danta."—C.A.C.

*MERIONES HURRIANÆ*, Jerd.

*The Indian desert Gerbil.*

(Synonymy in No. 3.)

19 ♂♂; 14 ♀♀. Palanpur, Gujerat.

2 ♂♂; 1 ♀. Lunwa, Palanpur.

♂♂; 6 ♀♀. Deesa, Palanpur.

5 ♂♂; 7 ♀♀. Danta, Mahi Kantha, Gujerat.

(See also Reports Nos. 3 and 10.)

A light yellow coloured gerbil, dirty-white on the underside, tail the same colour as back, with longer dark-brown hairs on the terminal end. Head and body about 5 inches, tail nearly as long. Weight about  $3\frac{1}{2}$  ozs.

"In immense numbers wherever there is sand, the country round Palanpur is literally honeycombed with the burrows of this species. It must be partially migratory, for large uninhabited colonies are frequently met with. The food consists of grass and probably roots. With a few exceptions I have noticed that *M. hurriannæ* does not burrow in cultivated areas. Until now, at Danta, I have found this species only on bare



sandy plains, here it is abundant in comparatively firm soil and is found right up to the foot of the hills and even in heavy jungle. It has become a pest since 1908."—C. A. C.

VANDELEURIA OLERACEA SPADICEA, Ryl.

*The Sandy-red Tree-Mouse.*

1914. *Vandeleuria oleracea spadicea*, Ryley. Journ., B. N. H. S., Vol. XXII, p. 658.

3 ♂♂; 1 ♀. Lunwa, Palanpur.

A small pale tawny mouse with a very long tail; dirty-white on the underside. Head and body about  $3\frac{1}{2}$  inches; tail about an inch longer. Weight about  $\frac{3}{4}$  oz.

"These specimens taken at Lunwa were all obtained in a large Fig tree; they are not easy to trap. Although this mouse is a climber, it is not particularly sure-footed. At night several fell out of the tree under which my camp was pitched. One fell on a box at my side and was easily caught; others were heard to fall on earth and a search with lamps sometimes rewarded us with a specimen. An amusing incident occurred during one of these hunts, the mouse having evaded our clutches for some time, suddenly vanished; after much searching the while my dinner got cold, we were about to give up the chase when one of the searchers appeared to go suddenly mad, when more composed he explained, that the mouse had taken refuge in his trousers!"—C. A. C.

GRYPOMYS GLEADOWI, Murray.

*The Sand-coloured Rat.*

(Synonymy in No. 10.)

7 ♂♂; 4 ♀♀. Lunwa, Palanpur.

(See also Report No. 10.)

A small greyish sandy fawn rat, pure white on the underside. Head and body nearly 4 inches; tail slightly shorter. Weight about 1 oz. Easily distinguished from *Gerbillus gleadowi* by its smaller hind foot and shorter tail which is without the longer hairs at the end.

"Found in soft sand, but favours a firmer soil. Cannot be common here, unless by any chance it inhabits burrows abandoned by *Meriones hurriannae*."—C. A. C.

EPIMYS RUFESCENS, Gray.

*The common Indian Rat.*

(Synonymy in No. 1.)

9 ♂♂; 16 ♀♀. Palanpur, Gujarat.

5 ♂♂; ♀. Lunwa, Palanpur.

5 ♂♂; ♀. Deesa, Palanpur.

2 ♂♂. Mount Abu, Bajputana.

4 ♂♂; 6 ♀♀. Danta, Mahi Kantha, Gujarat.

(See also all previous Reports.)

"Abundant in houses in Palanpur, not common in the fields, but is partial to Fig trees. Only common in the town at Danta."—C. A. C.

MILLARDIA MELTADA PALLIDIOR, Ryl.

*The Northern Soft-furred Field-Rat.*

1914. *Millardia meltada pallidior*, Ryley. Journ. B. N. H. S., Vol. XXII, p. 659.



8♂♂; 13♀♀. Lunwa, Palanpur.

1♂; 1♀. Deesa, Palanpur.

2♂ (1 skull only). Danta, Mahi Kantha, Gujerat.

A pale brownish grey rat, greyish white on the underside; fur soft. Head and body five or six inches long; tail nearly as long. Weight about  $2\frac{3}{4}$  ozs.

"Common at Lunwa, trapped in hedges. Appears to be rare at Danta."—C. A. C.

GOLUNDA ELLIOTI WATSONI, Blanf.

*The Northern Indian Bush-Rat.*

1876. *Pelomys watsoni*, Blanford, P. A. S. B., Vol. XLV, p. 181.

1891. *Golunda ellioti*, Blanf., Mammalia, No. 299 (partim).

2♂♂; 19♀♀. Lunwa, Palanpur.

2♂♂. Deesa, Palanpur.

17♂♂; 13♀♀. Mount Abu, Rajputana.

8♂♂; 2♀♀. Danta, Mahi Kantha, Gujerat.

In 1876 Blanford described a *Golunda*, collected by Mr. Watson from near Kotri, Sind, under the name of *Pelomys watsoni*; later he included this name in his synonymy of *G. ellioti*; however I am reviving the name for the specimens from Cutch, Kathiawar and the present collection, which are so conspicuously paler and yellower than the Southern form of *Golunda*, that they require to be distinguished subspecifically.

A brownish yellow rat, very finely speckled with black drab on the underside. Head and body about 5 inches long; tail about 4 inches. Of a lighter, yellower shade than the ordinary *Golunda ellioti* which is quite dark-brown with more black speckles. Weight about  $2\frac{3}{4}$  ozs.

"Common in hedges, comes out to feed very early in the evening, when, if approached very quietly, may be observed at a distance of a few feet. Often trapped during the day-time. It is sluggish in movement and is generally hunched up as if cold."—C. A. C.

MUS MANEI, Kel.

*The common Indian House-Mouse.*

(Synonymy in No. 5.)

2♂♂; 1♀. Palanpur, Gujerat.

1♂. Lunwa, Palanpur.

4♂♂; 2♀♀. Deesa, Palanpur.

(See also Reports Nos. 5, 6, 7, 8, 9, 10 and 11.)

"Common in houses in Palanpur, and in cultivation adjoining villages."—C. A. C.

MUS DUNNI, Wrought.

*The Northern Field-Mouse.*

(Synonymy in No. 3.)

8♂♂; 1♀. Palanpur, Gujerat.

16♂♂; 2♀♀. Lunwa, Palanpur.

6♂♂; 1♀. Deesa, Palanpur.

(See also Report No. 3.)

A very small drab coloured mouse, white on the underside. Head and body nearly  $2\frac{1}{2}$  inches; tail about the same length. Weight between  $\frac{1}{4}$  and  $\frac{1}{2}$  oz.



The Palanpur specimens agree with the type of *M. dunni* in colour, but some specimens are rather large, however as the drab colour is the most distinguishing characteristic I am considering them as *dunni* not *booduga*.

"Common in Palanpur, found in hedges and long grass."—C. A. C.

MUS BOODUGA, Gray.

*The Field Southern-Mouse.*

(Synonymy in No. 1.)

4 ♂♂. Mount Abu, Rajputana.

16 ♂♂; 8 ♀♀. 2 in al. 3413. Danta, Mahi Kantha, Gujerat.

(See also Reports Nos. 1, 2, 4, 5, 6, 7, 8, 9 and 11.)

These specimens taken from the more wooded country resemble *M. booduga*, while those from the open desert round Palanpur are all of the uniform drab colour characteristic of *M. dunni*. The same thing occurred in Kathiawar where the Junagadh specimens were dark and those from Rajkot and N. E. Kathiawar, pale drab.

"Scarce at Mount Abu. Common in hedges at Danta, very nimble and pugnacious."—C. A. C.

CREMNOMYS CUTCHICUS, Wrought.

*The Cutch Rock-Rat.*

(Synonymy in No. 3.)

36 ♂♂; 26 ♀♀. 1 in al. Mount Abu, Rajputana.

8 ♂♂; 1 ♀. Danta, Mahi Kantha, Gujerat.

(See also Reports Nos. 3, 8, 9 and 10.)

A medium-sized rat with a very long tail. Fur very soft and fairly long, brownish grey speckled with buff; white on the underside. Head and body about 5 inches long, tail about an inch longer. Weight about  $2\frac{3}{4}$  ozs.

The Danta specimens are rather darker in colour.

"Very abundant among the rocks at Mount Abu, occasionally trapped in hedges. I observed a pair at play on a large rock when they showed great activity, turning and twisting in a remarkable manner and clearly demonstrating the use of such long tails which were waved over their backs or from side to side for the purpose of balance. Not very abundant at Danta, confined entirely to the hills."—C. A. C.

LEGGADA SADHU, Wrought.

*The Ashy Spiny Mouse.*

(Synonymy in No. 3.)

22 ♂♂; 10 ♀♀. Mount Abu, Rajputana.

3 ♂♂; 2 ♀♀. in al. 3459. Danta, Mahi Kantha, Gujerat.

(See also Reports Nos. 3 and 10.)

A grey leggad speckled with buff and white on the underside; fur mixed with spines. Head and body about  $3\frac{1}{2}$  inches in length, tail slightly shorter. Weight about 1 oz.

"Common at Mount Abu. Found usually among rocks and stones.  
C. A. C.

LEGGADA PHILLIPSI, Wrought.

*Phillip's spined Mouse.*

(Synonymy in No. 4.)



1 ♂; 1 ♀. 1 in al. Mount Abu, Rajputana.  
6 ♂ ♂; 1 ♀. 1 in al. Danta, Mahi Kantha, Gujêrat.

(See also Report No. 4.)

A small dark mouse coloured leggad with tinges of drab. Coat composed almost entirely of spines; white on the underside. Head and body nearly three inches long; weight about  $\frac{1}{2}$  oz. Distinguished from *L. sadhu* by being slightly smaller, especially in the hind foot, and also having a much more spiny coat.

"Found generally under rocks on hills. Spiney mice are invariably found associating with *Cremnomys cutchicus*."—C. A. C.

BANDICOTA MALABARICA, Shaw.

*The Malabar Bandicoot.*

(Synonymy in No. 5)

2 ♂ ♂; 2 ♀ ♀. Danta, Mahi Kantha, Gujêrat.

(See also Report Nos. 5, 6, 7, 9, 10 and 11.)

"Specimens obtained from houses."—C. A. C.

GUNOMYS KOK, Gray.

*The Southern Mole Rat.*

(Synonymy in No. 1.)

♀ 3249. Mount Abu, Rajputana.

(See also Reports Nos. 1, 4, 5, 7, 8, 9, 10 and 11.)

"Rare at Mount Abu. No workings observed round Danta."—C. A. C.

HYSTRIX LEUCURA, Sykes.

*The Indian Porcupine.*

(Synonymy in No. 1.)

♀ 3118. Deesa, Palanpur.

(See also Reports Nos. 1, 2, 5, 10 and 11.)

"Well distributed at Mount Abu. I had the misfortune to lose one at which I fired, and a second that I trapped got free during the night. Rare about Danta, probably was common before."—C. A. C.

LEPUS DAYANUS, Blanf.

*The Sind Hare.*

(Synonymy in No. 3.)

9 ♂ ♂.

1 ♀. Palanpur, Gujarat.

4 ♂ ♂; 3 ♀ ♀. Lunwa, Palanpur.

3 ♂ ♂. Deesa, Palanpur.

4 ♂ ♂; 5 ♀ ♀. 2 in al. Mount Abu, Rajputana.

2 ♂ ♂. Danta, Mahi Kantha.

(See also Reports Nos. 3 and 10.)

A yellowish sandy grey hare with some black hairs on the back; reddish yellow legs and feet; white on the underside. Length about 18 inches. Weight about  $5\frac{1}{4}$  lbs.

"Plentiful in Palanpur and Mount Abu; but scarce at Danta where they should also have been plentiful."—C. A. C.



# BOMBAY NATURAL HISTORY SOCIETY'S MAMMAL SURVEY OF INDIA, BURMA AND CEYLON.

REPORT No. 13.

BY KATHLEEN V. RILEY.

COLLECTION	...	...	No. 13.
LOCALITY	...	...	S. Ceylon.
DATE	...	...	March—June 1913.
COLLECTED BY	...	...	Major E. W. Mayor.
EARLIER REPORTS	...	...	No. 1, E. Khandeish, Vol. XXI, p. 392, 1913; No. 2, Berars, Vol. XXI, p. 844, 1912; No. 3, Cutch, Vol. XXI, p. 826, 1912; No. 4, Nimar, Vol. XXI, p. 844, 1912; No. 5, Dharwar, Vol. XXI, p. 1170; No. 6, Kanara, Vol. XXII, p. 29, 1913; No. 7, Central Provinces, Vol. XXII, p. 45, 1913; No. 8, Bellary, Vol. XXII, p. 58, 1913; No. 9, Mysore, Vol. XXII, p. 283, 1913; No. 10, Kathiawar, Vol. XXII, p. 464, 1913; No. 11, Coorg, Vol. XXII, p. 486, 1913; No. 12, Palanpur, Vol. XXII, p. 684, 1914.

This collection was made in the southern portion of Ceylon, beginning with a few specimens from Colombo, the majority however were collected in the extreme south of the Island. Major Mayor gives the following notes on the actual collecting stations:—

*Kottawa, S. P.*—“About 10 miles inland from Galle, the ancient port of Colombo, 280 feet above sea-level, there is a small rest-house and one or two native huts. With the exception of a stretch of original forest (evergreen jungle), which runs either side of the road for a mile or so, the country is covered with Chena jungle, very thickly matted with a kind of bracken. “Chena” or “Hena” (Singalese) is the general name given to once cultivated land or burnt down forest, on which the jungle has been allowed to grow again. The rainfall is heavy and the climate damp with a muggy heat—land leeches abound.

I attribute the scarcity of small rodents and everything that lives near the ground to the general prevalence of these leeches.

Bats were very scarce. I only saw some small ones flying in the evening.

Galle has a very fine old Portuguese and Dutch Fort in good preservation, with ramparts, two miles round, and quite a town inside.

*Uduagama, S. P.*—A small village with a rest-house on the banks of the Gin-Ganya, about 16 miles N. of Kottawa, and at the end of the road. The country is composed of small hills running up to 500 or 600 feet, mostly rubber estates or deserted tea or coffee, covered with Chena. Heavy storms, practically every day and night; rainfall about this district to the end of March (1913) over 40 inches and before the little S. W. Monsoon. In the



valleys and round the villages are small paddy fields. Lot of Sambur or Elk (local name) about, and planters offer a reward of Rs. 10 per head and Rs. 5 for Porcupines; but these are rarely claimed, as the natives are too lazy, even though these rewards can be almost doubled by selling the flesh. Rats and mice seem scarce, also bats. I got practically no help at all from the villagers.

*Hiniduna, S. P.*—10 miles up the Gin-Ganya, thick evergreen jungle, "leechy" and no good.

*Ranna, S. P.*—Rest house, small bazaar and village, eight miles E. of Tangalla; is on a small river about 3 miles from the coast and lagoon; these are full of esturine crocodiles, with a man-eater, reported length about 16 feet, has killed three people and a number of cattle. The country gets much drier here, no forest, but one mass of "Lantana Chena," with paddy fields near the village, and an old dry tank  $1\frac{1}{2}$  miles distant. The Lantana is about 8 or 9 feet high and practically impenetrable, except by native tracts. Saw fresh Elephant tracks in the tank—water scarce. Natives here lazy, apathetic and non-observant with strong religious scruples against killing, and objected to my setting traps round the bazaar or gardens. Langurs plentiful along by the river, but hard to shoot and harder still to get when shot, as the jungle along by the river-bank is rattan cane jungle. Heard spotted deer in Chena, but impossible to see or get round them. Peacocks fairly plentiful.

*Hambantota, S. P.*—A port and fairly large village and bazaar, population about 2,000 with A. G. A. and Government Kacheri and Rest-house on the coast 18 miles E. of Ranna. A flat, dry sandy country, with low scrub and cactus trees surrounding several large salt water lakes or "Lewayas;" these dry up during the hot weather and deposit salt which is the main industry, fishing is also carried on. Population mixed Singalese, Tamils, Malays and Moormen. The Malays are descendants of one of the old disbanded Malay Regiments. The large Government salt store sheds are swarming with bats, but I could only get two species. The short-nosed and fulvous Fruit Bats I found living in a large jungle of Palmyra Palms on the sandhills by the sea. Practically nothing brought in by the local natives, but Mudeliyar Bahur of the salt works gave me a great deal of help and sent me a lot in from Kirinda, 25 miles away; but being so far off, they nearly all reached me too bad to skin. He is the only Mudeliyar so far who has really helped.

*Weligitta, S. P.*—About 9 miles N. E. of Hambantota in the centre of very dry scrubby cactus and thorn jungle; nearest village 4 miles; water very scarce here and drying up daily. There is a large old tank here, but it was burst in January, as at Ranna and many other places, by the exceptional rains which took place then.



Only saw some Langurs in a single clump of trees in the tank and it was impossible to get near them. Leopard were about, as cattle were killed, but there were no water holes near where they came. Bats scarce here, only got a few under a road culvert.

*Wellawaya, Uva Province.*—A small village, bazaar and rest-house in the S. W. of Uva on the Kirinda Oya river. Jungle here very thick, evergreen with large forest trees and rocky hills covered with vegetation; elevation 608 feet.

The Loris is reported to have been got on an estate 8 miles from here, when they felled the big trees in clearing, but I could not get any. A large cavern in the hills about 5 miles from here, evidently ancient nitrate workings, was full of bats, but they were very hard to get, as the roof is very high and an electric torch practically useless.

The natives here—the same as elsewhere—were of no assistance. Some Indian squirrels were brought in, but they wanted too much, as I found they could sell them in the bazaar for eating for 35 cents. each.

In the old Kandyan days this place was densely populated, but apparently it has anen decimated by fever, so I was informed by the M. O. of Badulla. There are large paddy fields around the village. Very few bats about.

*Kumbukkan, Uva.*—About 17 miles N.E. of Wellawaya; this is the beginning of the Rubber estates, that cover the Moneragalla Hills, 6 miles further on. This is an isolated range of Rocky Hills running up to over 3,000 feet. Kumbukkan is in the valley on the Kumbukkan Oya river, elevation 400 feet. On the S. E. is about a 40 mile track of very thick evergreen jungle full of Elephants, Buffalo, Leopards and Bears. Plenty of Langurs and even more Macaques, but very hard to get or see even, unless they are on the trees bordering the road. The large flying squirrel I found here as at Wellawaya. I was helped in every possible way by Mr. G. L. Horsfall, the P. D. of this estate. In Singalese "Ganga" = a large sized river, "Oya," = a medium sized river and "Ella" = a small sized river. This valley is bad for fever.

—E. W. M.

This collection consists of 368 specimens composed of 36 species in 28 genera.

It is particularly interesting having these specimens from Ceylon to compare with the mainland examples, in fact, it is absolutely necessary, in order to work out several of the Indian species which were originally described from Ceylon specimens and have remained rather doubtful until examples were obtained from the type locality. There are 11 species new to the Mammal Survey, viz:—*Simia pileatus*, *Presbytis cephalopterus* and *priamus*, *Roasettus seminudus*, *Miniopterus schreibersi*, *Mungos flavidens*,



*Petaurista lanka*, *Sciuropterus fuscocapillus*, *Ratufa macroura* and *macroura tennenti*, and *Funambulus trilineatus*.

The Ceylon form of *F. sublineatus* has proved to be distinct from the mainland variety and must in future be known by Kelaart's variation of the name, *trilineatus*. It is interesting to find *Millardina melleata* in Ceylon, this being the first time that specimens of this rat have been received from there.

As this collection was made in rather a restricted area in the extreme south, no attempt is going to be made to work out the specimens thoroughly until the whole of Ceylon has been completed.

#### SIMIA PILEATUS, Shaw.

##### *The Toque Monkey.*

- 1792. *Simia* (*Cercopithecus*) *sinicus pileatus*, Kerr, Anim. Kingd. No. 45.
- 1797. *Simia sinica* (nec. Linn.), Schreb. Saugth, p. 108.
- 1800. *Simia pileata*, Shaw, Gen. Zool. i pt. 1., p. 53.
- 1812. *Cerocebus sinicus* (nec. Linn.), E. Geoff. Ann. Mus. Hist. Nat., Paris, XIX, p. 98.
- 1847. *Macacus pileatus*, Blyth, J. A. S. B. XVI, p. 1272.
- 1888. *Macacus pileatus*, Blanford, Mammalia No. 11.

1 ♂. Kottawa, S. Ceylon.

1 ♀. Ranna, S. Ceylon.

2 ♀ ♀. Wellawaya, S. Ceylon.

1 ♀. Kumbukkan, S. Ceylon.

A yellow brown monkey of medium size, head and body length being about 20 inches, tail rather longer. Radiating parting on top of the head, dark fringe above eyes, tail dark grey. Neck and under-surface paler in colour.

#### PRESBYTIS CEPHALOPTERUS, Zimm.

##### *The purple faced Monkey.*

- 1780. *Cercopithecus kepalopterus*, Zimm., Geog. Gesch. 11, p. 185.
- 1825. *Cercopithecus leucoprymnus*, Otto, Nov. Acad. Caes. Leop. XII, p. 505, pl. XIV bis.
- 1825. *Semnopithecus fulvogriseus*, Desmoul., Dict. class. Hist. Nat. VII, p. 570.
- 1833. *Semnopithecus nestor*, Bennett, P. Z. S., p. 67.
- 1838. *Semnopithecus latibartatus*, Martin, Charlesw, Mag. Nat. Hist. 11 New Series, p. 439.
- 1852. *Presbytis cephaloptera*, Kelaart, Prod. p. 17.
- 1867. *Semnopithecus thersites*, Hutton, P. Z. S., p. 949.
- 1876. *Semnopithecus kelaati*, Schleg., Mus. Pays-Bas, Simiæ, p. 52.
- 1888. *Semnopithecus cephalopterus*, Blanf., Mammalia No. 17.

2 ♀ ♀. Kottawa, S. Ceylon.

A brown black monkey, top of head light-brown, neck and bushy tufts on side of face grey; ashy grey also on the rump. Head and body about 22 inches, tail about 4 inches longer. Weight about 14 lbs.

#### PRESBYTIS PRIAMUS, Blyth.

##### *The Madras Langur.*

- 1844. *Semnopithecus priam*, Elliot, Mss. Blyth. J. A. S. B. XIII, p. 470.



1844. *Sennopithecus pallipes*, Blyth, Ann. Mag. Nat. Hist., p. 312.  
 1847. *Presbytis priamus*, Blyth, J. A. S. B. XVI, p. 732, pl. LIV.  
 1847. *Presbytis thersites*, Blyth, J. A. S. B. XVI, p. 1271.  
 1888. *Sennopithecus priamus*, Blanford, Mammalia No. 14.

2 ♂ ♂, 1 ♀. Ranna, S. Ceylon.  
 2 ♀ ♀. Kirinda, S. Ceylon.  
 1 ♂. Weligatta, S. Ceylon.

A light earthy brown monkey with a creamy grey tinge. Radiating, parting on forehead and slight crest on top of head, and projecting black fringe above the eyes; some individual hairs on the back much longer than the rest, limbs and tail a darker greyish brown. Head and body about 23½ inches, tail about 28 inches. Weight about 16 lbs.

ROUSETTUS SEMINUDUS, Kel.

1850. *Pteropus seminudus*, Kelaart, J. R. A. S., Ceyl. 11, 5, p. 329.  
 1870. *Xantharpyria seminuda*, Gray, Cat. Monk. etc., p. 115.  
 1888. *Xantharpyria amphexicaudata*, Blanf., Mammalia No. 137 (partim).

1 ♂. Hambantota, S. Ceylon.

A light yellow-brown fruit bat. Very scanty covering of hair both above and below; shoulders practically bare. Head and body about 5 inches, tail about ½ inch.

CYNOPTERUS SPHINX SPHINX, Vahl.

*The Southern Short-nosed Fruit Bat.*

(Synonymy in No. 6.)

1 ♀. Hambantota, S. Ceylon.

(See also Reports Nos. 6, 9 and 11.)

LYRODERMA LYRA, Geoff.

*The Indian Vampire Bat*

(Synonymy in No. 1.)

1 ♀. Udugama, S. Ceylon.

1 ♂, 1 ♀. Nagoda, S. Ceylon.

(See also Reports Nos. 1, 4, 5, 6, 7, 8, 9 and 12.)

HIPPOSIDEROS DUKHUNENSIS, Sykes.

*Sykes Leaf-nosed Bat.*

(Synonymy in No. 5.)

16 ♂ ♂, 21 ♀ ♀. 5 in al. Hambantota, S. Ceylon.

4 ♂ ♂. Weligatta, S. Ceylon.

(See also Reports Nos. 5, 6, 8, 9 and 11.)

HIPPOSIDEROS FULVUS, Gray.

*The Bicoloured Leaf-nosed Bat.*

(Synonymy in No. 3.)

1 ♀. Hambantota, S. Ceylon.

(See also Reports Nos. 3, 5, 6, 7, 8, 9, 10 and 12.)

RHINOLOPHUS ROUXI, Temm.

*The Rufous Horse-shoe Bat.*

(Synonymy in No. 5.)



- 1 ♂. Wellawaya, S. Ceylon.  
8 in al. Lunugalla, S. Ceylon.

(See also Reports Nos. 5, 6 and 9.)

A small bat varying very much in colour from greyish-brown to bright reddish yellow. Very complicated nose-leaf and large ears. Head and body a little over 2 inches, tail extending to end of membrane.

PIPISTRELLUS COROMANDRA, Gray.

*The Coromandel Pipistrelle.*

(Synonymy in No. 5.)

- 1 ♂, 1 ♀. Nakaidiniya, S. Ceylon.

(See also Reports Nos. 5, 9 and 11.)

PIPISTRELLUS MIMUS, Wrought.

*The Southern Dwarf Pipistrelle.*

(Synonymy in No. 1.)

- 2 ♂ ♂, 2 ♀ ♀, 1 in al. Ranna, S. Ceylon.

- 2 ♂ ♂, 3 ♀ ♀, 4 in al. Hambantota, S. Ceylon.

(See also Reports Nos. 1, 2, 3, 5, 6, 7, 8, 9, 10, 11 and 12.)

MINIOPTERUS SCHREIBERSI, Kuhl.

*The Long-winged Bat.*

1817. *Vespertilis schreibersi*, Natterer, Kuhl, Deutsche Flederm, p. 41.

1835. *Vespertilio fuliginosa*, Hodgson, J. A. S. B., IV, p. 700.

- 2 ♂ ♂, 8 in al. Wellawaya, S. Ceylon.

A small dark-brown bat with small ears and no nose-leaf. Head and body about 2 inches, tail about the same length and extending to end of membrane.

PACHYURA, Sp.

*Shrews.*

- 1 ♀. Udugama, S. Ceylon.

- 1 ♀. Wellawaya, S. Ceylon.

(See also Reports Nos. 1, 3, 4, 5, 6, 7, 9, 10, 11 and 12.)

FELIS PARDUS, L.

*The Panther.*

(Synonymy in No. 5.)

- 1 ♂. Tanamawilla, S. Ceylon.

(See also Reports Nos. 5, 6, 9 and 11.)

FELIS RUBIGINOSA, Geoffr.

*The Rusty-Spotted Cat.*

(Synonymy in No. 5.)

- 2 ♂ ♂. Weligatta. S. Ceylon.

(See also Report No. 5.)

A pale fawn grey cat with dark-brown spotted longitudinal lines down the back, the side ones being light-brown, on the head and shoulders they



appear in the form of very dark-brown lines. Underside nearly white with black spots. Tail fawn grey. Head and body about 17 inches; tail nearly half that length. Weight about 3 lbs.

MUNGOS SMITHI, Gray.

*The ruddy Mongoose.*

(Synonymy in No. 7.)

- 1 ♀. Ranna, S. Ceylon.
- 1 ♀. Hambantota, S. Ceylon.
- 2 ♂♂, 1 ♀. Weligatta, S. Ceylon.
- 1 ♂, 1 ♀. Wellawaya, S. Ceylon.

(See also Reports Nos. 7 and 12.)

MUNGOS FLAVIDENS, Kel.

*The Ceylon Brown Mongoose.*

- 1850. *Herpestes flavidens*, Kelaart, J. R. A. S. Ceylon II 5, p. 323;
- 1851. *Herpestes fulvescens*, Kelaart, J. A. S. B., XX, p. 162.
- 1851. *Cynictis maccarthae*, Gray, P. Z. S., p. 131 and 184.
- 1885. *Herpestes ceylonicus*, H. Nevill, Taprobanian, i, p. 62.
- 1888. *Herpestes fulvescens*, Blanford. Mammalia No. 63.

- 1 ♂. Weligatta, S. Ceylon.
- 2 ♀♀, Kumbukkan, S. Ceylon.

Kelaart changed the name of this species from *flavidens* to *fulvescens* in the following year but as it was published first in the J. R. A. S., Ceylon, under the former name, *flavidens* must stand, in 1852 he again uses *fulvescens* in his Prodromus.

A yellow-brown mongoose speckled with black, some of the hairs being tipped with reddish brown, feet almost black. Head and body nearly 16 inches, tail about the same length. Weight about 3 lbs. This mongoose is very similar to *M. fuscus* but smaller.

VIVERRICULA MALACCENSIS, Gmel.

*The Small Indian Civet.*

(Synonymy in No. 3.)

- 1 ♂. Ranna, S. Ceylon.
- 1 ♂. Weligatta, S. Ceylon.
- 1 ♂. Kumbukkan, S. Ceylon.

(See also Reports Nos. 3, 5, 7, 10, 11 and 12.)

PARADOXURUS NIGER, Desm.

*The Indian Toddy Cat.*

(Synonymy in No. 5.)

- 1 ♂, 1 ♀. Udugama, S. Ceylon.
- 1 ♂. Nakaideniya, S. Ceylon.

(See also Reports Nos. 5, 7, 8 and 11.)

MELURUS URSINUS, Shaw.

*The Sloth-Bear.*

(Synonymy in No. 11.)

- 1 ♂. Kumbukkan, S. Ceylon.

(See also Report No. 11.)



## PETAURISTA LANKA, Wrought.

*The Large Grey Flying-Squirrel.*

1891. *Pteromys oral*, Blanford, Mammalia No. 227 (*partim*).  
 1911. *Petaurista lanka*, Wroughton, H. B. N. H. S., XX, p. 1017.  
 1 ♀. Kumbukkan, S. Ceylon.  
 1 ♂. Wellawaya, S. Ceylon.

A large grey flying squirrel, hairs dark-ashy grey, tipped with white; feet and hands black; underside greyish white; fur very soft. Head and body about 16 inches. Distinguished from the mainland form (*P. philippensis*) by the absence of the reddish-brown tinge.

## SCIUROPTERUS (PETINOMYS) FUSCOCAPILLUS, Blyth.

*The Small Flying-Squirrel.*

1847. *Sciuropterus fuscocapillus*, Blyth, J. A. S. B., XVI, p. 867.  
 1850. *Sciuropterus layardi*, Kelaart, J. R. A. S., Ceyl., 11., p. 328.  
 1879. *Pteromys fuscocapillus*, Anderson, An. Zool. Res., p. 294.

1 ♀. Wellawaya, S. Ceylon.

A small reddish-brown flying-squirrel. Fur dark-ashy grey tipped with chestnut-brown. Fur very soft, especially on the tail; underside paler in colour. Conspicuous long dark hairs surrounded the ears, these are absent in *S. fimbriatus*. Head and body about 12 inches, tail about the same length.

## RATUFA MACROURA, Penn.

*The Black Giant Squirrel.*

1769. *Sciurus macrourus*, Pennant, Ind. Zool. 1., pl. 1.  
 1785. *Sciurus ceilonensis*, Boddaert, Elench. An., p. 117.  
 1888. *Sciurus macrurus*, Blanford, Mammalia No. 241 (*partim*).  
 2 ♀ ♀. Kottawa, S. Ceylon.

A large squirrel, black above, sometimes brownish black; tail, hands and feet black; bright yellow buff on the underside, this colour coming round to the outside of the arms and legs which helps to distinguish it from the Burma species *R. gigantea*. Buff markings also on the face and top of the head. Head and body about 16 inches, tail about the same length.

## RATUFA MACROURA TENNENTI, Blyth.

*The Grizzled Giant Squirrel.*

1849. *Sciurus tennenti*, Blyth, J. A. S. B., XVIII, p. 600.  
 1888. *Sciurus macrurus*, Blanford, Mammalia No. 241 (*partim*).

1 ♂, 1 ♀. Ranna, S. Ceylon.  
 1 ♂, 1 ♀. Wellawaya, S. Ceylon.  
 1 ♂, 2 ♀ ♀. Kumbukkan, S. Ceylon.

A squirrel similar to *R. macroura*, but is bay coloured, grizzled with white above; underside, legs and markings on head and face are creamy yellow. The forehead is almost black, and in some cases the shoulders are brown black and not grizzled. The tail is blackish-brown grizzled with grey. Head and body about 15½ inches, tail slightly longer. Weight about 2 lbs.

Blanford has transposed the names *macroura* and *tennenti* as Mr. Wroughton pointed out in his paper on the "Giant Squirrels" (J. B. N. H. S., Vol. XIX, p. 885, 1910.)



## FUNAMBULUS PALAMARUM, L.

*The Palm Squirrel.*

(Synonymy in No. 2.)

- 2 ♂♂, 2 ♀♀. Colombo, Ceylon.  
 2 ♂♂, 2 ♀♀. Kattawa, S. Ceylon.  
 4 ♂♂, 7 ♀♀. Udugama, S. Ceylon.  
 3 ♂♂, 1 ♀. Ranna, S. Ceylon.  
 7 ♂♂, 3 ♀♀. Hambantota, S. Ceylon.  
 3 ♂♂. Weligatta, S. Ceylon.  
 3 ♂♂, 5 ♀♀. Wellawaya, S. Ceylon.  
 4 ♂♂, 1 ♀, 1 in al. Kumbukkan, S. Ceylon.

(See also Reports Nos. 2, 4, 5, 7, 8 and 9).

These squirrels may represent *P. brodei* (Blyth), but until specimens come in from further north this cannot be definitely stated.

## FUNAMBULUS TRILINEATUS, Kel.

*The Newera Eliya ground Squirrel.*1852. *Sciurus trilineatus*, Kelaart, Prod. p. 54.1891. *Sciurus sublineatus*, Blanford, Mammalia No. 256 (*partim*.)

- 1 ♂. Kottawa, S. Ceylon.

A small dark-brown squirrel finely specked with yellow, having three slightly paler longitudinal stripes on the back, underside pale tawny. Fur soft and dense. Tail hairs banded black and yellow. Head and body about 5 inches, tail about the same length. The differences between this form and *F. sublineatus* will be found in the "Scientific Results", Vol. XXII, p. 661.

## TATERA INDICA, Hardw.

*The Indian Gerbil.*

(Synonymy in No. 1.)

- 1 in al. Undugama, S. Ceylon.  
 2 ♂♂, 3 ♀♀. Ranna, S. Ceylon.  
 11 ♂♂, 16 ♀♀. Hambantota, S. Ceylon.  
 1 ♀. Tellula, S. Ceylon.  
 3 ♂♂, 3 ♀♀. Weligatta, S. Ceylon.  
 3 ♀♀. Wellawaya, S. Ceylon.
- (See also Reports Nos. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12.)

## MILLARDIA MELTADA, Gray.

*The Soft-furred Field-Rat.*

(Synonymy in No. 1.)

- 2 ♂♂, 2 ♀♀. Ranna, S. Ceylon.  
 2 ♂♂, 11 ♀♀, 1 in al. Hambantota, S. Ceylon.  
 3 ♂♂. Weligatta, S. Ceylon.  
 2 ♂♂, 1 ♀. Wellawaya, S. Ceylon.

(See also Reports Nos. 1, 3, 4, 5, 7, 10 and 11.)

## EPIMYS RUFESCENS, Gray.

*The Common Indian Rat.*

(Synonymy in No. 1.)

- 4 ♂♂, 1 ♀. Colombo, Ceylon.



- 5 ♂♂, 4 ♀♀. Hambantota, S. Ceylon.  
2 in al. Kumbukkan, S. Ceylon.

VARIETY with white underparts.

- 1 ♂. Kottawa, S. Ceylon.  
7 ♂♂, 7 ♀♀, 1 in al. Udugama, S. Ceylon.  
1 ♂. Nakaideniya, S. Ceylon.  
5 ♀♀. Colombo.  
6 ♂♂, 5 ♀♀. Hambantota, S. Ceylon.  
1 ♂, 1 ♀. Weligatta, S. Ceylon.  
3 ♂♂, 1 ♀. Wellawaya, S. Ceylon.  
5 ♂♂, 6 ♀♀. 1 in al. Kumbukkan, S. Ceylon.

(See also all previous Reports.)

MUS MANEI, Kel.

*The Common Indian House-Mouse.*

(Synonymy in No. 5.)

- 1 ♂, 1 ♀. Colombo.  
5 ♂♂, 3 ♀♀, 3 in al. Udugama, S. Ceylon.  
2 ♂♂, 1 ♀. Nakaideniya, S. Ceylon.  
1 in al. Wellawaya, S. Ceylon.  
1 in al. Hambantota, S. Ceylon.

(See also Reports Nos. 5, 6, 8, 9, 10, 11 and 12.)

MUS BOODUGA, Gray.

*The Southern Field-Mouse.*

(Synonymy in No. 1.)

- 1 ♂, 1 ♀. Kottawa, S. Ceylon.  
3 ♂♂, 4 ♀♀, 1 in al. Hambantota, S. Ceylon.  
2 ♂♂, 5 ♀♀. Weligatta, S. Ceylon.  
6 in al. Kumbukkan, S. Ceylon.

(See also Reports Nos. 1, 2, 4, 5, 6, 7, 8, 9, 10, 11 and 12.)

BANDICOTA MALABARICA, Shaw.

*The Malabar Bandicoot.*

(Synonymy in No. 5.)

- 2 ♀♀. Udugama, S. Ceylon.

(See also Reports Nos. 5, 6, 7, 9, 10 11 and 12.)

LEGGADA HANNYNGTONI, Ryl.

*The Coorg lowland Leggad.*

(Synonymy in No. 11.)

- 1 ♀. Kottawa, S. Ceylon.

(See also Report No. 1).

LEPUS NIGRICOLLIS, Cuv.

*The black-naped Hare.*

- 1 ♂, 2 ♀♀. Hambantota, S. Ceylon.  
2 ♂♂. Kirinda, S. Ceylon.  
1 ♂. Weligatta, S. Ceylon.  
1 ♂. Kumbukkan, S. Ceylon.

(See also Reports Nos. 5, 6, 8, 9 and 11.)



## TRAGULUS MEMINNA, Erxl.

*The Indian Chevrotain or Mouse Deer.*

(Synonymy in No. 6.)

- 1 ♂. Kumbukkan, S. Ceylon.

(See also Reports Nos. 6 and 11.)

## MANIS CRASSICAUDATA, G. St. Hil.

*The Indian Pangolin.*

(Synonymy in No. 3.)

- 1 ♂. Kirinda, S. Ceylon.

(See also Reports Nos. 3, 6, 8, 9 and 11.)

## REPORT NO. 14.

BY KATHLEEN V. RYLEY.

*With Field Notes by the Collector, G. C. Shortridge.*

COLLECTION	...	...	No. 14.
LOCALITY	...	...	N. Shan States, Burma.
DATE	...	...	April—June 1913.
COLLECTED BY	...	...	Mr. G. C. Shortridge.
EARLIER REPORTS	...	...	No. 1, E. Kandeish, Vol. XXI, p. 392, 1912; No. 2, Berars, Vol. XXI, p. 820, 1912; No. 3, Cutch, Vol. XXI, p. 826, 1912; No. 4, Nimar, Vol. XXI, p. 844, 1912; No. 5, Dharwar, Vol. XXI, p. 1170; No. 6, Kanara, Vol. XXII, p. 29, 1913; No. 7, Central Provinces, Vol. XXII, p. 45, 1913; No. 8, Bellary, Vol. XXII, p. 58, 1913; No. 9, Mysore, Vol. XXII, p. 285, 1913; No. 10, Kathiawar, Vol. XXII, p. 464, 1913; No. 11, Coorg, Vol. XXII, p. 486, 1913; No. 12, Palampur, Vol. XXII, p. 684, 1914; No. 13, S. Ceylon, Vol. XXIV, p., 700, 1914.

This collection was made in the Northern Shan States and the following notes on the Geography of the country in general and on the actual collecting stations are given by Mr. G. C. Shortridge:—

“Burma roughly consists of that portion of the Indian Empire which lies to the east of the Bay of Bengal. Extending from about latitude 28° to 10° North, and between 91° and 101° longitude at its broadest part.

It mainly consists of the valleys of the Irrawaddy, Chindwin and Salween rivers with the ranges of hills lying east and west of the two former.

Below the mouth of the Salween river it extends as a narrow strip between the sea and Siam until it almost meets the northern boundary of the Malay States. The province for administrative purposes has been separated into 8 divisions with 35 districts and in addition to the semi-independent Shan States are grouped for the same purpose into two portions known as Upper and Lower Burma.

The hill country of the Chins to the westward of the Chindwin is also a separate administrative district. Population (1911) about



12,115,200. Total area about 171,430 square miles. Principal exports—Rice, timber, beans, cotton, mineral oil, &c.

As regards the Zoology of Burma, the Gazetteer (1900) draws attention to the fact that no systematic scientific research has as yet been carried out.

The present collection was chiefly made in "Hsipaw" one of the Northern Shan States.

Only a portion of the Northern and Eastern frontiers of the Shan States have been as yet defined. The total area is estimated at between 40,000 and 50,000 square miles, and they lie approximately between 19° and 24° North latitude and 96° and 102° longitude. The mountain ranges which run fan-wise from the high steppes of Tibet are at first almost as sharply defined as the deep gorges through which the rivers run. The Shan Plateau is properly the country between the Salween and Irrawaddy rivers. On the West it is abruptly marked by the long line of hills which begin near Bhamo and run Southwards till they sink into the plains of Lower Burma, and on the East it is no less sharply marked by the deep narrow rift of the Salween—the most uncompromising boundary in the world.

The original Salween-Irrawaddy watershed is disturbed in its continuity by the Taping and Shweli rivers, and then comes a geographical fault where the Nam Tu takes its rise at no great distance from the Salween and runs from east to west into the Irrawaddy.

The average height of the Plateau is between 2,000 and 3,000 feet but it is seamed and ribbed by mountain ranges (Peaks rising to the height of from 6,000 to 8,000 feet) which split up and run into one another though they still preserve the original north and south direction, and leave space here and there for broad rolling downs, sometimes only for flat bottomed valleys which form long riband lines of cultivation. Except in the north the hills are covered with forest. That part of the Shan States which extends to the east of the Salween is much less open and presents no clearly defined ranges of mountains, but rather a confused and intricate mass of hills, and beyond a few narrow valleys, no open space can be seen until the basin of the Mekong is reached.

The climate of the Shan States varies considerably from December to February, it is cool everywhere, and in the open downs as much as 10 degrees of frost may be experienced. In most parts during the hot weather the shade temperature does not exceed 80°-90°. Although in the narrow valleys especially in that of the Salween, the shade maximum reaches 100° regularly about April. The rains begin about the end of May and with the exception of one or two breaks are more or less continuous until November, from July to October being the wettest months. The



rainfall varies greatly in different parts of the States but seems to range between 60 and 100 inches.

Hsipaw State lies between  $21^{\circ}-56'$  and  $22^{\circ}-56'$  North and  $96^{\circ}-13'$  and  $98^{\circ}$  East. Area, 5,086 square miles. Bounded on the north by the Ruby Mines district and the States of Mongmit and Tawng-peng; on the east by North and South Hsenwi; on the south by the Mandalay district from which it is separated for some distance by the Nam Pia river. It is divided into four sub-States, Hsipaw proper, Hsumhsai, Mōnglong and Mōngtung. The main State lies in the geographical fault which runs east and west from the Salween at Kunlong to near the rim of the Shan tableland at the Gokteik Gorge—one of the chief features of the State down which flows a small tributary of the Nam Tu; and the country is here broken up into a mass of not very well defined ridges and spurs.

The country is drained by the Nam Tu (Myitnge) which on the Southern border of the State runs in a deep gorge about 2,000 feet below the general level of the country. "Taungya" rice is grown on the hills and "wet" rice in the valleys; other crops cultivated are sesamum, cotton, ginger, oranges and tea.

The chief plain land is in the valley of the Nam Tu near Hsipaw town, and the Pyaunggaung—Nawngpeng strath, south-west of the capital of the State. Population (1901), 104,700, by far the greater portion (90,000) being Shans, the remainder chiefly consisting of Burmans, Danus, Kachins and natives of India.

In Hsipaw and probably many of the other Shan States the chief thing to be noted from a zoological point of view is the alteration of the natural conditions of a large part of the country due to "Taungya" or "dry rice" cultivation which will account for the rarity or non-existence of many mammals peculiar to heavy forest country. In "Taungya" cultivation, an area is cleared by fire and roughly tilled; rice is then grown for one or two seasons after which the ground is temporarily exhausted, when another area is similarly cleared, a low deciduous scrub growing up in the tracts that have been abandoned. Except in such inaccessible places as the gorges of the rivers where the jungle is evergreen and very thick, or in the valleys where "wet rice" is grown, a very large part of the State is covered with deciduous scrub forest of more or less recent growth, which at one time or another has been cleared and under cultivation, while the fires lit for this purpose during the dry season spread over and annually burn off the undergrowth nearly everywhere, probably driving away a large number of animals as effectually as the bush fires of Australia do. With a few exceptions the larger Mammals are rare except on the northern boundary of the State on the borders of the Ruby Mines district, where Elephant, Rhinoceros (*sumatrensis*),



Bison, Tsaine, Sambur, Thamin, and Hog Deer are said to occur. Tiger (*Hso-Long*), Bear (*torquatus* and *malayanus*), Pig and Serow exist mostly sparingly in suitable localities. I also received reports of the existence of the Clouded Leopard (*Hso-Awn*), Porcupine, Hare, Loris (*Linglom*), Otter (*Mohn*); Flying Squirrel, Ferret Badgers and Anteaters (*Lin*). While in Hsipaw State I received every assistance from the Saw-Bwa of Hsipaw, Messrs. H. A. Thornton, the Superintendent, and F. S. Grose, Asst. Superintendent of the Northern Shan States.

The following are short descriptions of the actual places visited :—

*Gokteik*.—Altitude 2,133 feet.

The station close to the Gokteik Gorge through which flows a tributary of the Nam Tu. The valley is here spanned by a natural arch which is again crossed by a steel viaduct, 350 feet high and almost 1,000 feet above the bed of the river. "Taungya" rice is largely grown. The jungle in the gorge is evergreen, and on the slopes of the hills deciduous.

*Pyawnggaung*.—Altitude 2,794 feet.

A Shan village on the Mandalay-Lashio line, two stations to the east of Gokteik. Situated in fairly level country where "wet rice" is grown. Surrounding country as elsewhere under "Taungya" cultivation.

*Hsipaw town*.—Altitude 1,354 feet.

The capital of the State. Population 3,656. Situated in the valley of the Nam Tu. Surrounded by large tracts of wet rice cultivation.

*Se'en*.—Altitude 1,411 feet.

A small forest village two stations to the east of Hsipaw on the banks of the Nam Yao. Hilly country and rather heavy jungle containing a large proportion of Teak. Patches of "Taungya" cultivation.

*Mamsam Falls*.—Altitude 2,000 feet, about 10 miles to the east of Se'en on the Nam Yao river. Country similar to Se'en. Evergreen jungle on the banks of the river.

*Maymyo*.—The principal hill station of Burma. Altitude 3,500 feet. Population (1901) 6,223. The station occupies an undulating plateau surrounded by hills covered with thin forest. Although in the Mandalay district, Maymyo is on the Shan Plateau and is geographically a part of Hsipaw State.

Through the kindness and assistance on the part of the Honourable Sir Harvey Adamson, K.C.S.I., Lieutenant-Governor of Burma, Messrs. G. B. H. Fell, C.I.E., the Hon. Mr. W. J. Keith and other Government Officials, including those in the Forest and Public Works Departments, Members of the Bombay-Burma Trading Company, as well as numerous Burma Members of the



Bombay Natural History Society, I was able to start the Mammal Survey in Burma under exceptionally favourable circumstances. The amount of local interest shown is particularly welcome as on account of being the first work of its kind to be systematically attempted in Burma, its results are expected to be of the utmost scientific value." G.C.S.

The specimens from the Ataran river were collected by Mr. J. Pemberton Cook, while various others were received from other members of the B. N. H. S.

The collection is made up of 439 specimens containing 37 species in 24 genera.

As was to be expected the majority of the species have not previously been obtained during the Mammal Survey, there being 22 species to add to the list this time.

Three varieties of monkeys were sent in, viz., *Hylobates hoolock*, *Simia rhesus* and *Fresbyitis phayrei*. Bats were very numerous, some large series being obtained among the *Hipposideros*, principally *armiger*, *larvatus* and *lylei*, this latter species was especially interesting as Mr. Thomas had just described it on a single specimen from N. Siam. The squirrels were well represented also, and this good series from the N. Shan States made it possible to separate the northern variety subspecifically from the difficult and variable group of *Sciurus atrodorsalis* into *S. atrodorsalis shanicus*, as Mr. Wroughton had suggested some time ago. And in the *Mus booduga* group I have made a new species, *Mus cookii*, of the present form, on its large size. Specimens of the *Tupaia* have at last been obtained, up till now Tree Shrews had been unrepresented in the Survey collections.

There are splendid series of the two species of *Rhizomys*, *castaneus*? and *cinereus*, among the latter there are some very large specimens.

Thanks are due to all those members who helped Mr. Shortridge by sending specimens, which have been included in an Appendix to this report.

#### HYLOBATES HOOLOCK, Harlan.

##### *The Hoolock or White-browed Gibbon.*

1834. *Simia hoolock*, Harlan, Trans. Amer. Soc., IV., New Series, p. 52.

1837. *Hylobates choromandus*? Ogilby, P. Z. S., p. 689.

1888. *Hylobates hoolock*, Blanf., Mammalia. No. 1.

2 ♂♂, 1 ♀. Gokteik, N. Shan States.

1 ♀. Pyaunggaung, N. Shan States.

General colour black, brownish black on the shoulders, eyebrows white; some specimens are pale-brown shading into pale yellowish white on the head and shoulders. Fur very thick and woolly. Head and body about 23 inches; no tail; weight about 14½ lbs. In these four specimens the two males are black throughout and the females pale whitish brown.



"Blanford is incorrect in stating that even in the females of this species, the frontal band is invariably conspicuously paler than the rest of the head. Although, as in *Hyllobates lar*, the sexes may vary in colour, the present set shows that in all probability the male is normally black and the female brown.

Not nearly so plentiful in Hsipaw State as the Langur. The specimens observed were going about either singly or in pairs, although where plentiful they are said to be gregarious."—G. C. S.

Vernacular name.—WU-WA (Shan).

*SIMIA RHEBUS*, Audeb.

*The Bengal Monkey.*

(Synonymy in No. 7.)

- 1 ♂, 1 skull only, 2 ♀ ♀, 1 in al. Pyaunggaung, N. Shan States.  
4 ♂ ♂, 1 ♀. Mamsam Falls, N. Shan States.

(See also Report No. 7.)

These specimens belong to the *Simia rhesus* group, not *Simia assamensis* as might have been expected, as they are without the radiating parting, and their colouring and general appearance are similar to *rhesus*.

General colour grey, washed with yellow brown; the head, shoulders, arms and hands being the darkest, while the hind quarters and hind legs are the most yellow. Black hairs on the supraorbital ridge; no radiating parting on the head. Tail short and similar in colour to the hind quarters. Head and body about 21 inches; tail about 9 inches; weight 14 lbs. None of the above specimens are more than young adults.

"Fairly plentiful in Hsipaw State; apparently more local than *Presbytis*. Like other Macaques often frequenting paddy fields and other cultivated lands. Rather shy. Gregarious though not observed in large parties."—G. C. S.

Vernacular name.—LING-LENG.

*PRESBYTIS PHAYREI*, Blyth.

*Phayre's Leaf-Monkey.*

1847. *Semnopithecus phayrei*, Blyth, J. A. S. B. XVI, p. 733, pl. XXXI.  
1844. *Semnopithecus obscurus*, Blyth, J. A. S. B. XIII, p. 466 (nec Reid).  
1851. *Semnopithecus argentatus*, Blyth, Horsf. Cat. Mamm. Mus. E. Ind. Co. p. 7.  
1870. *Semnopithecus rubicundus*, var. C., Gray, Cat. Monkeys, etc., Brit. Mus., p. 7.  
1888. *Semnopithecus phayrei*, Blanf., Mammalia No. 23.  
5 ♂ ♂, 6 ♀ ♀. Gokteik, N. Shan States.  
1 ♂, 2 ♀ ♀. Pyaunggaung, N. Shan States.  
2 ♂ ♂, 2 ♀ ♀. Se'en, N. Shan States.  
1 ♂, 1 ♀. Mamsam Falls, N. Shan States.

A dark earthy brown Langur with a light shade on the back of the neck and shoulders, the longer hairs round the ears are also paler; there is a radiating parting just above the eyebrows; hair round the mouth, whitish; tail slightly lighter than the general body colour. Head and body about 22 inches; tail about 29; weight somewhere about 16 lbs.

"In adults the bare skin around the eyes is of a bright slate blue, with a broad crescent shaped area of bluish white on the inner sides almost encircling each orbit. A triangular patch of flesh colour surrounds the nostrils and mouth. Ears dull slate. In the very young specimens, the fur is straw colour while the bare parts on the face are entirely dull slate. Mr. T.



A. Hauxwell, I. F. S., informs me that he once noticed a straw or rufous coloured Langur on the upper Chindwin together with a number of normal coloured individuals—probably this, or an allied species from which it would seem that like the Javan *Presbytis pyrrhus*, the bright colouring of the immature, occasionally remains unchanged through life.

Plentiful in Hsipaw State, going about in troupes like other Langurs. A shy and apparently a not very noisy species."—G. C. S.

Vernacular names.—LINGMUN, LINGKANG? (Shan).

CYNOPTERUS SPHINX SPHINX, Vahl.

*The Southern short-nosed Fruit Bat.*

(Synonymy in No. 6.)

1 ♂ juv. Pyaunggaung, N. Shan States.

(See also Reports Nos. 6, 9, 11 and 13.)

LYRODERMA LYRA, Geoff

*The Indian Vampire Bat.*

(Synonymy in No. 1.)

4 ♀ ♀, 1 in al. Pyaunggaung, N. Shan States.

(See also Reports Nos. 1, 4, 5, 6, 7, 8, 9, 12 and 13.)

"In a cave near Pyaunggaung. Megaderms are seldom found in company with other bats, probably on account of their predaceous habits, but these specimens were found in a cave inhabited by a number of *Hipposideros armiger* which were probably too large for them to attack."—G. C. S.

This is probably the first time that specimens of this species have actually been recorded from Burma.

RHINOLOPHUS PERNIGER, Hodgs.

1843. *Rhinolophus perniger*, Hodgs., J. A. S. B. XII, p. 414.

1888. *Rhinolophus luctus*, Blanf., Mammalia No. 145 (*partim*).

1 ♂. Gokteik, N. Shan States.

This species is the largest in the genus and was separated from *Rh. luctus* by K. Andersen (A. M. N. H. Vol. XVI, p. 252, 1905) on its larger size.

It is a large dark brown bat with soft woolly fur, having an ashy brown, almost speckled appearance. Tail extending to the end of the membrane; large ears and large complicated nose-leaf. Head and body nearly 4 inches, weight about 1½ oz.

HIPPOSIDEROS ARMIGER, Hodgs.

*The Great Himalayan leaf-nosed Bat.*

1835. *Hipposideros armiger*, Hodgson, J. A. S. B. Vol. IV, p. 699.

1846. *Hipposideros diadema*, Cantor, J. A. S. B. Vol. XV, p. 181, *nee*, Geoff.

1872. *Phyllorhina armigera*, Hutton, P. Z. S., p. 700.

1888. *Hipposideros armiger*, Blanf., Mammalia No. 159.

5 ♂ ♂, 13 ♀ ♀, 16 in al. Pyaunggaung, N. Shan States.

1 ♂, 7 ♀ ♀, 2 in al. Mamsam Falls, N. Shan States.

A large brown leaf-nosed bat. Fur thick and soft, pale at the base with darker brown tips, paler on the shoulders; large ears and nose-leaf.



Fur on underside uniform earthy-brown; tail extending to end of membrane. Head and body about 4 inches; weight about  $1\frac{1}{4}$  ozs.

"Plentiful in caves around Pyaunggaung and near the Mamsam Falls; on one occasion found in company with *H. larvatus*."—G. C. S.

#### HIPPOSIDEROS LYLEI, Thos.

##### *Lyle's nose-leaf Bat.*

1913. *Hipposideros lylei*, Thomas, A. M. N. H., Vol. XII, p. 88.

19♂, 19♀, 36 in al. Pyaunggaung, N. Shan States.

A fairly large leaf-nosed bat, very similar to *armiger* in general colour, the fur being composed of the same two shades of brown, but it is easily distinguished from that bat by its smaller size and its larger and more complicated nose-leaf which is especially large in the male; it also has a pale edge to the interfemoral membrane. Head and body about  $3\frac{1}{2}$  inches; weight about  $1\frac{3}{4}$  ozs.

When Mr. Thomas separated this bat from *H. pratti*, he only had a male specimen of *lylei* and a female *pratti* on which to work, but now that this large series of skins and spirit specimens have been obtained, the differences in the other sexes are equally well borne out. The type locality of *H. lylei* is N. Siam.

"Large colonies found in caves around Pyaunggaung, sometimes in company with *H. larvatus*."—G. C. S.

#### HIPPOSIDEROS LARVATUS, Horsf.

##### *Horsfield's leaf-nosed Bat.*

1824. *Rhinolophus larvatus, vulgaris, deformis* and *insignis*, Horsfield, Res. Java.

1844. *Hipposideros larvatus* and *vulgaris*, Blyth, J. A. S. B. XIII, p. 488.

1872. *Phyllorhina larvata*, Dobson, P. A. S. B., p. 155.

1888. *Hipposideros larvatus*, Blanf., Mammalia No. 165.

10 ♂♂, 11 ♀♀, 13 in al. Pyaunggaung, N. Shan States.

6 ♂♂, 1 ♀. Mamsam Falls, N. Shan States.

A bat of the same shades of brown as *H. armiger* and *lylei*, but considerably smaller in size. Large ears and nose-leaf. Head and body not quite 3 inches.

"In caves. Plentiful."—G. C. S.

Vernacular name.—(Shan and Burmese) LINO (all bats).

#### HIPPOSIDEROS FULVUS, Gray.

##### *The Bicoloured leaf-nosed Bat.*

(Synonymy in No. 3.)

1 ♀, 2 in al. Gokteik, N. Shan States.

(See also Reports Nos. 3, 5, 6, 7, 8, 9, 10, 12 and 13.)

"A small colony found roosting in the roof of the Railway Bungalow at the Gokteik, where they occasionally flew into the rooms."—G. C. S.

#### PIPISTRELLUS CEYLONICUS, Kel.

##### *Kelaart's Pipistrelle.*

(Synonymy in No. 1.)

1 ♀, 1 in al. Pyaunggaung, N. Shan States.

(See also Reports Nos. 1, 2, 3, 5, 6, 8, 9, 10, 11 and 12.)

"This specimen contained 3 young."—G. C. S.



PIPISTRELLUS COROMANDRA, Gray.

*The Coromandel Pipistrelle.*

(Synonymy in No. 5.)

1 ♂. Pyaunggaung, N. Shan States.

(See also Reports Nos. 5, 9, 11 and 13.)

PIPISTRELLUS AUSTENIANUS, Dobs.

1871. *Pipistrellus austenianus*, Dobson, P. A. S. B., p. 213.

1888. *Pipistrellus mordax*, Blanf., Mammalia No. 183 (*partim*).

2 ♂♂. Maungmye, N. Shan States. (T. A. Huxwell.)

A small bat, fur practically black with light brown tips; underside the same with rather more conspicuous pale tips. Tail extending just beyond the membrane. Head and body nearly 2 inches.

Mr. T. A. Huxwell obtained the above two specimens of this interesting *Pipistrelle*, which will probably turn out to be *P. austenianus*, but we cannot say for certain until specimens have been obtained from Cherra Pungi, the type locality. Blanford considers it as a synonym of *P. mordax*.

TYLONYCTERIS PACHYPUS, Temm.

*The Club-footed Bat.*

(Synonymy in No. 5.)

1 ♀, 1 in al. Pyaunggaung, N. Shan States.

1 ♀, 1 in al. Se'en, N. Shan States.

(See also Reports Nos. 5, 6 and 11.)

"Apparently more plentiful than the *Pipistrelles* in the camps visited."  
—G. C. S.

SCOTOPHILUS KUHLI, Lach.

*The Common Yellow Bat.*

(Synonymy in No. 1.)

1 ♂. Hsipaw, N. Shan States.

(See also Reports Nos. 1, 3, 5, 6, 7, 9 and 12.)

TUPAIA CHINENSIS, Anders.

*The Irrawaddy Tree Shrew.*

1879. *Tupaia chinensis*, Anderson, Zool. Res. Yunnan, p. 129, pl. 7.

1888. *Tupaia ferruginea*, Blanf., Mammalia No. 102 (*partim*).

2 ♂♂, 3 ♀♀. Pyaunggaung, N. Shan States.

2 ♀♀. Se'en, N. Shan States.

1 ♂, 1 ♀, 1 in al. Mamsam Falls, N. Shan States.

Anderson describes his species from the Kakhyen hills on the Irrawaddy. Mr. Lyon is just bringing out a paper on the whole genus of *Tupaia*, so it is not worthwhile to give a proper synonymy at present, as all previous species are being split up and considerably altered by him.

General colour brown (of an olive shade) speckled with black and buff; underside dirty white, sometimes of a yellowish white. There is occasionally a yellow stripe in front of the shoulder. Tail same colour as the body. Head and body about  $7\frac{1}{2}$  inches, tail about the same length; weight about  $5\frac{1}{2}$  ozs.



"Diurnal. Fairly plentiful, although probably local. When once recognised they are not likely to be mistaken for squirrels, except at a distance. Although active and constantly on the move they do not take the big leaps from tree to tree that squirrels of a similar size do. Blandford gives the mammary formula for *Tupaia* as 4; in this species and probably in others there are 6."—G. C. S.

FELIS BENGALENSIS, Kerr.

*The Leopard Cat.*

1. Ruby Mines, N. Shan States.
1. Maymyo, N. Shan States (T. A. Hauxwell.)  
(See also Report No. 11)

"Not plentiful"—G. C. S.

Vernacular name.—HEN-WAP. (Shan).

FELIS TEMMINCKI, Vigors and Horsf.

*The Golden Cat.*

1828. *Felis temmincki*, Vigors and Horsf., Zool. Journ. III, p. 451.
1831. *Felis moormensis*, Hodgs., Gleanings in Science III, p. 177.
1888. *Felis temmincki*, Blanf., Mammalia No. 34.

3145. (no skull). Maymyo, N. Shan States. (Major Stewart.)

A large chestnut-bay coloured cat, with a deeper chestnut stripe down the back and darker markings on the head and face. Paler on the under-surface with dark spots on the breast. Tail thick and dark red. No measurements are recorded on the above specimen.

"This specimen, which was received from Major Stewart, was shot near Maymyo over a calf that it had killed."—G. C. S.

Vernacular names.—Hso-HPAI, MIAO-HTÖN (wild cat).

FELIS PARDUS, L.

*The Panther.*

(Synonymy in No. 5.)

- 1 (black) Ruby Mines, N. Shan States.

(See also Reports Nos. 5, 6, 9, 11 and 13.)

"Plentiful as in the Malay countries. Melanistic individuals seem to be of more frequent occurrence than in India."—G. C. S.

Vernacular name.—Hso-SOM (Shan).

FELIS (domestic.)

- 1 ♂. Maymyo, N. Shan States.
- 1 ♂. Pyaunggaung, N. Shan States.

(See also Reports Nos. 9 and 11.)

"These specimens are typical of those kept in the Shan villages."—G. C. S.

Vernacular name.—MIAO (Shan).

VIVERRA ZIBETHA, L.

*The Large Indian Civet.*

1766. *Viverra zibetha*, L., Syst. Nat. 1., p. 55.
1829. *Viverra undulata*, Gray, Spic. Zool., p. 9.



1842. *Viverra orientalis*, hodie *melanurus* Hodgs. Calc. Journ. N. H. 11, p. 47.

1841. *Viverra melanurus*, Hodgs., J. A. S. B., X. p. 90.

1888. *Viverra zibetha*, Blanford, Mammalia No. 45.

4 ♂♂, 1 ♀. Pyaunggaung, N. Shan States.

1 ♀. Gokteik, N. Shan States.

A dark brownish grey civet, with a black crest down the middle of the back; black feet and black stripes along the side of the neck. Black and white rings on the tail. Head and body about 33 inches; tail 18 inches; weight of a male about 20 lbs.

"Plentiful. Like *Viverricula* this species appears to attach itself to the vicinity of villages, probably a scavenger and a poultry thief. Very easy to trap".—G. C. S.

Vernacular name.—AMNGE, HEN-HAWN. (Shan.)

PAGUMA LARVATA INTRUDENS, Wroughton.

*The North Burma Palm Civet.*

1910. *Paguma larvata intrudens*, Wroughton, J. B. N. H. S., Vol. XIX, p. 793.

1 ♂, 2 ♀♀. Pyaunggaung, N. Shan States.

General colour buff grey, under-fur brownish grey, hairs with pale buff tips; in one of the three specimens the tail was the same colour as the body, in the other two it was black for more than half its length. Head black, with white markings on the cheeks and below the ears; a broad white stripe extending up the nose to the top of the head and continuing down between the shoulders where it becomes narrower; chin dark brown; toes nearly black. Underside of body dirty white. Head and body 27 inches, tail about 3 inches shorter; weight 11 lbs.

"All of the specimens were shot in trees by day. Although arboreal, most *Paradoxures* hide by day among rocks, hollow trees, and roofs of houses. This species seems to choose thick foliage to lie up in. This is a heavier animal than any other species of "Toddy cat" weighed; two specimens weighing 9½ and 11 lbs. respectively".—G. C. S.

CANIS INDICUS, Hodgs.

*The Jackal.*

(Synonymy in No. 1 under *C. aureus*.)

1 ♀. Pyaunggaung, N. Shan States.

(See also Reports Nos. 1, 3, 4, 5, 6, 7, 9, 10, 11 and 12.)

"Considered decidedly scarce in the Northern Shan States, occasionally appearing around Maymyo, where however they cannot be plentiful, as when hounds were kept there, a few years ago, they were seldom put up. Although said to be comparatively numerous in parts of Lower Burma, Jackals in Burma generally appear to be uncommon and migratory where they do occur".—G. C. S.

Vernacular name.—MANIA (Shan) (also used for the wild dog).

URSUS MALAYANUS, Raffles.

*The Malay Bear.*

1822. *Ursus malayanus*, Raffles, Tr. Linn. Soc. XIII, p. 254.

1 (not sent). Ruby Mines, N. Shan States.

"This species as well as *Ursus torquatus* appears to be fairly numerous in suitable localities".—G. C. S.



## RATUFA GIGANTEA, McCl.

*The Assam Giant Squirrel.*1839. *Sciurus giganteus*, McClelland, P. Z. S, p. 150.1891. *Sciurus bicolor*, Blanford, Mammalia, No. 240 (*partim*).

5 ♂♂, 7 ♀♀. Gokteik, N. Shan States.

1 ♂. Pyaunggaung, N. Shan States.

1 ♂. Se'en, N. Shan States.

1 ♀. Mamsam Falls, N. Shan States.

A large black squirrel, sometimes brownish black. Buffy yellow below; sides of face (beneath the ears) and underside of legs and neck also yellow; tail black throughout. Head and body about 16 inches; tail about the same length. Weight about 5 lbs. This squirrel is similar in colour to the Ceylon species *R. macroura*, but that squirrel is distinguished by having the yellow markings extending over to the top of the arms and legs and having slight pale markings on the head. Mr. Wroughton in his paper on the "Giant Squirrels" (J. B. N. H. S. Vol. XIX, 1910), separates *R. gigantea* from the Java *R. bicolor* and from Hodgson's *macruroides*.

"Plentiful in all big forests especially round Gokteik, quite identical in habits with other giant squirrels."—G. C. S.

Vernacular name.—MAMAI (Shan).

## SCIURUS PHAYREI, Blyth.

*Phayre's Squirrel.*1855. *Sciurus phayrei*, Blyth, J. A. S. B. XXIV, p. 472, 476.1891. *Sciurus phayrei*, Blanford, Mammalia No. 247.

7 ♂♂, 7 ♀♀. Gokteik, N. Shan States.

3 ♂♂, 4 ♀♀. Pyaunggaung, N. Shan States.

6 ♂♂, 6 ♀♀. Se'en, N. Shan States.

A grey squirrel finely speckled with black, some have a slightly brownish yellow tinge; tail of same colour with a somewhat ringed appearance, tip black; underside orange yellow with a distinctive blackish band, separating the grey from the orange, on the underside of the flanks. Feet pale yellow; whiskers black. Head and body about 10 inches, tail, slightly longer. Weight about 13½ ozs. These specimens are rather greyer and paler throughout than the Martaban and Tenasserim examples.

"A particularly active species, its leaps from tree to tree almost rivalling those of *Ratufa*. Around Hsipaw town and Se'en, even more plentiful than *atrodorsalis shanicus*. Not observed at Maymyo."—G. C. S.

## SCIURUS ATRODORSALIS SHANICUS, Ryl.

*The Shan squirrel.*1914. *Sciurus atrodorsalis shanicus*, Ryley, Journ. B. N. H. S. Vol. XXII, page 662.

2 ♂♂, 4 ♀♀. Maymyo, N. Shan States.

4 ♂♂, 6 ♀♀. Gokteik, N. Shan States.

13 ♂♂, 3 ♀♀. Pyaunggaung, N. Shan States.

An olive brown squirrel, finely speckled with yellow and black; ears reddish yellow; underside yellower than black, sometimes slightly tawny. Middle of back shaded with black. Tail black and yellow. Head and body about 8 inches in length, tail about 7 inches.

"The most plentiful squirrel in Hsipaw State and around Maymyo, recalling *Funambulus palmarum* of India in its habit of collecting around bungalows. The black mark on the back was seldom conspicuous except in immature specimens."—G. C. S.

Vernacular name.—SOIN (all small squirrels) (Shan).



## DREMOMYS RUFIGENIS, Blanf.

*The Red-cheeked Squirrel.*1878. *Sciurus rufigenis*, Blandford, J. A. S. B. XLVII, pt. 2, p. 156.1891. *Sciurus rufigenis*, Blanf., Mammalia No. 244.

2 ♂ ♂. Gokteik, N. Shan States.

8 ♂ ♂, 4 ♀ ♀. Pyaunggaung, N. Shan States.

General colour brown, finely speckled with yellow and black, with an olive shade on the back; hindquarters, head and feet, rufescent; sides of head and underside white; tail black, faintly ringed with white. Head and body about 8 inches; tail about 6 inches. Weight  $8\frac{1}{2}$  ozs.

"Not uncommon in forest country but much less plentiful than *atrodorsalis shanicus* and *phayrei*."—G. C. S.

## TAMIOPS MACCLELLANDI BARBEI, Blyth.

*The Striped Burmese Squirrel.*1847. *Sciurus barbei*, Blyth, J. A. S. B. Vol. XVI, p. 875.1891. *Sciurus maclellandi*, Blanf., Mammalia No. 257 (*partim*).

1 ♂, 1 ♀. Pyaunggaung, N. Shan States.

A small greyish brown squirrel speckled with pale yellow; 5 black longitudinal stripes on the back, with 4 pale yellow ones between, the two outer yellow stripes being much wider and extend from the side of the face. Ears black with a tuft of white hairs. Underside reddish yellow. Head and body about  $4\frac{1}{2}$  inches, tail about 5 inches. Weight  $1\frac{3}{4}$  ozs.

"Apparently rare, possibly local."—G. C. S.

## EPIMYS RUFESCENS, Gray.

## VARIETY with white underparts.

*The Common Indian Rat.*

(Synonymy in No 1.)

2 ♂ ♂, 13 ♀ ♀. Gokteik, N. Shan States.

7 ♂ ♂, 6 ♀ ♀. Pyaunggaung, N. Shan States.

1 ♀. Se'en, N. Shan States.

1 ♂. Hsipaw, N. Shan States.

2 ♂ ♂, 4 ♀ ♀. Mamsam Falls, N. Shan States.

(See also all previous Reports.)

"Very plentiful in towns and villages, although all specimens were white below, many had a grey patch on the chest, sometimes extending to form a line down the belly.

The scarcity of jungle rats and mice, other than burrowers, can be accounted for by the "Taungya" cultivation previously described."—G. C. S.

## EPIMYS JERDONI, Blyth.

*The bicoloured Rat.*1863. *Leggada jerdoni*, Blyth, J. A. S. B. XXXII, p. 350.1888. *Mus jerdoni*, Blanf., Mammalia No. 279.

1 ♂, 1 juv. ♂. Pyaunggaung, N. Shan States.

A red yellow rat, with a very long tail. Under-fur slate grey, tips bright red yellow. Feet and underside pure white, line of demarcation distinct, tail dark above pale below. Head and body nearly 6 inches; tail about 8 inches. Weight  $2\frac{3}{4}$  ozs.



## MUS MANEI, Kel.

*The Common Indian House-Mouse.*

(Synonymy in No. 5.)

- 1 ♂, 1 ♀. Maymyo, N. Shan States.  
 1 ♂. Maymyo, N. Shan States. (G. B. Fell).  
 1 ♂, 2 ♀ ♀. Gokteik, N. Shan States.  
 2 ♂ ♂, 1 ♀. Se'en, N. Shan States.

(See also Reports Nos. 5, 6, 8, 9, 10, 11, 12 and 13.)

"Plentiful in Maymyo and in towns and villages throughout Hsipaw State."—G. C. S.

## MUS COOKII, Ryl.

*The Burma Field-Mouse.*

1914. *Mus cookii*, Ryley, Journ. B. N. H. S. Vol. XXII. p. 663.

- 2 ♂ ♂, 1 ♀. Gokteik, N. Shan States.  
 2 ♂ ♂, juv. 2 ♀ ♀. Pyaunggaung, N. Shan States.

A small dark-brown mouse, slightly speckled with buff; grey on the underside. Head and body about 3 inches, tail slightly longer.

## RHIZOMYS CASTANEUS ? Blyth.

*The Bay Bamboo-Rat.*

1843. *Rhizomys castaneus*, Blyth, J. A. S. B. Vol. XII, p. 1007.  
 1891. *Rhizomys badius*, Blanf., Mammalia No. 312. (*partim*.)

- 3 ♂ ♂, 7 ♀ ♀. Gokteik, N. Shan States.  
 7 ♂ ♂, 5 ♀ ♀. Pyaunggaung, N. Shan States.  
 1 ♂, 2 ♀ ♀. Se'en, N. Shan States.  
 1 ♀. Mamsam Falls, N. Shan States.

These specimens probably represent *R. castaneus* (Blyth) described from Arrakan, but must only be left provisionally under this name, until specimens are obtained from the type locality. They differ from *R. badius* (Hodgs.) from Nepal in being smaller, especially in the size of their teeth and from the representatives of *R. minor* (Gray) from Siam in their smaller size; and also in the shape of the bullæ.

Fur very soft and silky, dark ashy brown with a brown sheen on the tips, some have rufous tips; whiskers short. Colour of underside, much the same as above. Feet and tail bare. Head and body 7-8 inches; tail about 3 inches.

The rufous or dark colouration appears to have no connection with age as there are both young and old specimens of each colour. In this series the white spot is absent, in one case only did the collector find any indication of it.

"Blanford gives the mammary formula of *Rhizomys* as 10, and although this is the case, with *Rhizomys cinereus*, this species has only 8, having two pairs of inguinal mamme instead of 3. The mole hills are similar to those of *Gumomys* except that this species throws up more mounds, being probably a much quicker burrower. The tunnels are as a rule very deep and as all specimens had to be dug up they were not very easy to obtain, especially as the ground they chose for burrowing in is often very hard and stony. There were numbers of these burrows under the Gokteik viaduct. This species can hardly be called a bamboo rat, as it feeds on all kinds of roots including shrubs, grass and other herbaceous plants, frequently coming into gardens.



Recalling the African *Georychus* and equally savage when caught. Very sluggish in its movements when above ground, and having a curious habit of running backwards when placed in new surroundings. Its powers of sight above ground, except for a very short distance, are very poor. Blanford in describing its ears as hidden by the long fur of the head, evidently judged from dry specimens, as although small, they are white in colour and show up during life very conspicuously."—G. C. S.

## RHIZOMYS CINEREUS, McCl.

*The large Burmese Bamboo-Rat.*

1842. *Rhizomys cinereus*, McClelland, Calc. Journ. N. H. II, p. 456.

1877. *Rhizomys erythrogenys*, Anderson, P. A. S. B., p. 150.

1888. *Rhizomys sumatrensis*, Blanf., Mammalia No. 314 (*partim.*)

2 ♂♂, 1 ♀. Gokteik, N. Shan States.

5 ♂♂, 4 ♀♀. Pyaunggaung, N. Shan States.

1 ♀. Se'en, N. Shan States.

1 ♂. Mamsam Falls, N. Shan States.

McClelland described *Rhizomys cinereus* in 1842 from Tenasserim and mentions its red cheeks. Anderson in 1879 puts *R. cinereus* into the synonymy of *Rhizomys sumatrensis* and describes *R. erythrogenys* (from the Salwin Hill tracts), as a new species, on account of its red cheeks, which *sumatrensis* is without, at the same time he mentions a similar specimen from Tenasserim with red cheeks, therefore it would appear that the name *R. cinereus* stands for the red cheeked species as separated from *sumatrensis* (described by Raffles from Malacca), and that *erythrogenys* must be included in the synonymy.

A very large grey rat, the grey hairs being rather more numerous than the black except on the head between the ears where the black predominate. The sides of the head are bright red; tail absolutely bare. Head and body about 17 inches; tail about 6 inches. Weight about 6½ lbs. (one large specimen weighing 11½ lbs.). Incisors very large and strong; head broad.

"This species digs deep, burrows in bamboo jungle, on the roots of which they largely feed. Very savage when cornered, facing round and making short rushes at anything moved in front of them; apparently seeing much more clearly than the smaller species; their eyes also being larger in proportion. Although altogether more active than *R. castaneus*, they are not quick enough to make their escape readily when above ground, their fastest movement being a clumsy gallop while they will always face about on the least provocation, biting savagely at anything put near them, at the same time making a peculiar grating noise with their teeth and grunting rather like a porcupine which they rather resemble in some ways. I kept specimens for varying lengths of time in a tin bath, and if they could not reach the edge, when standing on their hind legs, they were unable to get out.

Their eyes at night give a bright red reflection.

Tail tipped with white for about a third of its length. A large specimen weighed about 11½ lbs."—G. C. S.

## MUNTIACUS VAGINALIS, Bodd.

*The Barking Deer.*

(Synonymy in No. 2.)

2 ♀♀. Gokteik, N. Shan States.

1 ♀. Pyaunggaung, N. Shan States.

(See also Reports Nos. 2, 6, 7 and 11.)



## APPENDIX.

The following specimens were received with this collection, but were obtained in other districts and sent in by various members of the Society, all of whom we wish to thank. It is of the greatest help to have specimens sent in during the different months of the year as the survey collector only obtains his skins within a limited period, thus it is often difficult to know how much to allow for seasonal changes in the colour and texture of the fur.

Mr. J. P. Cook sent in the following :—

*SCIURUS ATRODORSALIS*, Gray.

*The black-backed Squirrel.*

1842. *Sciurus atrodorsalis*, Gray, A. M. N. H. Vol. X, p. 263.

1855. *Sciurus hyperuthrus*, Blyth, J. A. S. B. Vol. XXIV, p. 474.

2 ♀ ♀. Moulmein, Burma.

A yellow grey squirrel, slightly speckled with black; black patch on back; head a reddish yellow; whiskers usually white; underside generally chestnut red, but in some cases it is yellow or even speckled like the back; tail black and yellow. Head and body about  $8\frac{1}{4}$  inches; tail about the same length.

*TAMIOPS MACLELLANDI BARBEI*, Blyth.

2 ♀ ♀. Moulmein, Burma.

*RHIZOMYS CINEREUS*, McCl.

1 ♂. Moulmein, Burma.



# NOTES ON SOME MAMMALS FOUND IN THE SIMLA DISTRICT, THE SIMLA HILL STATES, AND KALKA AND ADJACENT COUNTRY.

BY

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While working the Ornithology of the Simla District, N. W. Himalayas, I have, during the last eighteen months or so, taken the opportunity of devoting some of my time to the study of the Mammalian fauna of these tracts, and the results of my observations are embodied in the following notes. It must not for a moment be supposed that, the areas to which these observations relate have either been searched systematically, or explored thoroughly and in a business-like manner; for to do so would require a great deal of time and means, neither of which it is my happy lot to possess. As a matter of fact, I have collected only those animals, which have actually come in my way in my wanderings after birds, and without making any special search for them. I hope, therefore, that due allowance will be made for these disjointed notes, which have been hastily strung together at odd moments of leisure. Should they prove of any interest—Mr. Kinnear flatters me that they will be of considerable interest—it may act as an inducement for the publication hereafter of further notes on some more of the animals inhabiting these regions.

Before entering into particulars, it seems desirable to notice, in as brief a manner as possible, the extent and geographical positions of the territories to which the subsequent remarks apply; their physical aspects, and their climatological conditions. Moreover, as the fauna and flora of a country are not only connected with, but to a great measure dependent on, each other, a few references to the vegetation of these hills will not be irrelevant to our subject.

The districts under notice lie very roughly between the 30th and the 32nd degree of North latitude, and between the 77th and 79th degree of East longitude. They comprise—(a) the Simla District; (b) the Simla Hill States; (c) a small portion of the Patiala State, which lies in the Himalayan area; and (d) the town of Kalka and adjacent country, including the Western Dun of the Sirmur State.

The Simla District consists of nine detached tracts in the lower Himalayas, between  $38^{\circ} 58'$  and  $31^{\circ} 22'$  N. and  $77^{\circ} 7'$  and  $77^{\circ} 43'$  E., with a total area of 101 square miles. It is completely surrounded by territories of independent chiefs, and these territories are known as the Simla Hill States.

The Simla Hill States consist of 28 in number, and occupy an area of about 4,800 square miles. The largest of these States is



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Bashahr. It lies on either bank of the Sutlej River : all the other Simla Hill States lie to the south of that river.

The small bit of the Patiala State occupies an area of about 1,000 square miles, and stretches from the Siwalik Hills to the town of Simla, of which it forms the northern and eastern boundary.

The town of Kalka is situated at the foot of the outlying range of the Himalayas, and has an elevation of 2,400 feet. It is entirely surrounded by native territory.

The physical aspects and scenery of these tracts have been admirably described in the *Imperial Gazetteer* :—

“The Simla District and surrounding Native States,” remarks the author, “form a continuous series of ranges, ascending from the low hills which bound the plains of Ambala to the great central chain of the Western Himalayas. This central chain terminates a few miles south of the Sutlej in Bashahr, the most northern of the States. The same State is broken on its northern frontier by spurs from the snowy hills, which separate it from Spiti, and on the east by similar spurs from the range shutting it off from Chinese Tartary. Starting from the termination of the Central Himalayas, a transverse range (the last to the south of the Sutlej), runs south-west throughout the length of the Simla States, forming the watershed between the Indus and the Ganges—here represented by their tributaries, the Sutlej and the Jumna. A few miles north-east of Simla, the spur divides into two main ridges, one of which curves round the Sutlej Valley towards the north-west; while the other, crowned by the town of Simla, trends south-eastward to a point a few miles north of Sabathu, where it merges at right angles in the mountains of the Outer or sub-Himalayan system, which run parallel to the principal range. South and east of Simla, the hills between the Sutlej and the Tons (the principal feeder of the Jumna), centre in the great peak of Chaur, 11,982 feet high, itself the termination of a minor chain that branches off southwards from the main Simla range. The mountain system (excluding Bashahr) may be thus mapped out roughly into three portions : the Chaur Peak and spurs radiating from it, occupying the south-east corner ; the Simla range, extending from the Central Himalayas to the neighbourhood of Sabathu ; and the mountains of the sub-Himalayan series, running from the north-west to south-east, and forming the boundary of the Ambala plains. The last-mentioned group may be sub-divided into the sub-Himalayas proper, and an outer range, corresponding to the Siwalik Hills of Hosbiarpur. The sub-Himalayan and the Siwalik ranges form parallel lines, having



between them an open space of varying width, known as the Kiara Dun, a broad and well cultivated valley."

"The scenery in the immediate neighbourhood of Simla itself presents a series of magnificent views, embracing on the south the Ambala plains, with the Sabathu and Kasauli hills in the foreground, and the massive block of the Chaur, a little to the left; while just below the spectator's feet a series of huge ravines lead down into the deep valleys, which score the mountain sides. Northwards the eye wanders over a net-work of confused chains, rising range above range, and crowned in the distance by a crescent of snowy peaks, which stand out in bold relief against the clear background of the sky."

The principal rivers by which the drainage of these hills is effected are the Sutlej, the Pabbar, the Giri, the Ghambhar, and the Sarsah.

The upper parts of the Bashahr principality, extending from its northern confines of Kunawar to its eastern limits at Shipki, on the Tibetan frontier, belong to what is generally known as the "Alpine" zone of the Himalayas, and contain much Tibetan admixture both in their flora and fauna. The plants here present an arctic facies. Some of the characteristic Mammalian fauna of these high altitudes are, *Felis uncia*—the Ounce; *Ursus isabellinus*—the Brown Bear; *Pseudois nakura*—the Baral; and *Capra sibirica*—the Himalayan Ibex. These animals seldom descend to lower elevations unless driven by the rigours of an exceptionally severe winter. This belt is beyond the influence of the Indian monsoons, which are practically spent before they reach Chini (9,000 feet)—almost in the centre of Bashahr—and much of the rainfall is in winter in the form of snow. Close to the Tibetan border, there is always a continuous wind, driving dust and dry snow along with it, and stunting the whole vegetation.

Next to Bashahr are some of the other Hill States, surrounding the sanitarium of Simla, with elevations varying from about 6,000 to 8,000 or 9,000 feet. The districts embraced between these altitudes are generally spoken of as the "Middle Himalayas," and have aptly been designated the "Forest" region, for nature here wears the garb of the temperate zone. This section is subject to the full force of the monsoons, the average annual rainfall amounting to 65 inches, and "includes some of the largest forests of the Himalayan cedar, especially in the neighbourhood of Nachar, stretching on one side into the Wangur and Baspa valleys, and on the other, along the tops of the hills, to almost the immediate vicinity of Simla. About Gaora and Serahan—between 7,000 and 9,000 feet—some of the finest specimens of *Ulmus himalayensis*, *Pavia indica*, *Juglans regia*, Mulberry, and other trees



occur, and besides a thick vegetation of low forests and brushwood. There exists on these moderate elevations a particularly mild climate, and the supply of water is abundant during the whole year." A few of the animals characteristic of this zone are the Flying Squirrels (*P. fulvinus* and *S. fimbriatus*), the Serow, and the Musk-deer (*M. moschiferus*).

Proceeding southwards from the Military Cantonment of Sabathu (4,500 feet) in the direction of Kalka, the Indian character of the flora and fauna becomes at once prevalent, and we find ourselves in the "sub-tropical" zone of the Himalayas. The Cheer Pine—*Pinus longifolia*—gets rarer the lower we descend, while such Indian forms as *Ficus bengalensis*, *Ficus religiosa*, *Bombax malabaricum* rapidly appear. Thick jungles of Bamboos, *Carissa spinarum*, and *Zizypus ctenophia* now become the predominant feature in the vegetation, interspersed with shady groves and gardens of *Musca*, loquat, mango and orange trees. On rocky cliffs and in caverns around Sabathu, Dagshai and Kasauli the first specimens of *Hyæna hyæna*—the Striped Hyæna and *Felis affinis*—the Jungle Cat are to be found. The common Five-Striped Squirrel—*Funambulus vennanti*—and the Indian Wild Boar—*Sus cristatus*—abound everywhere. In scrubby jungles and brushwood are seen the common *Mungos mungo* and *Vulpes bengalensis*; while, at the foot of the hills, *Canis pallipes*, *Mellivora indica*, *Antelope cervicapra*, *Boselaphus tragocamelus*, and other familiar Indian forms occur. Such is the neighbourhood of Kalka and adjacent country, the fauna and flora of which differ in no way from those of the plains of the upper Punjab, and which forms the southern limit of the extent to which my observations apply.

The arrangement followed in the enumeration of Orders and Species is that of Blanford in his MAMMALIA, Fauna of British India, 1888-1891, to which references have been given; the nomenclature has, however, been altered, as far as possible, in the light of recent zoological researches.

In conclusion, I take this opportunity of expressing my grateful thanks to Mr. N. B. Kinnear, M.B.O.U., for all his kind help and valuable suggestions, without which my notes would never have seen the light of day; to His Highness the Maharaja of Patiala, for granting me passes and facilities for travelling about in his territory; to Mr. L. W. Reynolds, C.I.E., I.C.S., Deputy Secretary to the Government of India in the Foreign and Political Department, for his kindness in procuring me passes and facilities, without which it would have been impossible for me to visit some of these Hill States; and to Mr. C. H. Johnstone for some of the very interesting material with which he has supplied me for this paper. My grateful thanks are also due to Mr. G. W. Marshall, I.S.O., for his kindness in allowing me access to various Government and other publications, during



the course of my zoological studies; and lastly, but not least, to Messrs. Cecil Kirkpatrick and Lionel Harrington for their kindness in having glanced through these sheets, and for having suggested various helpful alterations in the manuscript.

#### ORDER—PRIMATES.

##### 1. *SIMIA RHEBUS*, Audeb.—*The Bengal Monkey*.

(Blanford No. 3.)

(Simla—"Bandar"; Simla Hill States (outer ranges) = "Kailu".)

The following are the measurements of a very large ♂ procured in the neighbourhood of Simla on the 5th September last:—

Head and body (between pegs) 507 mm.; tail (without hair) 228 mm.; hand 108 mm.; ear 44 mm.

*Skull.* From the supraoccipital to the end of premaxillaries 127 mm.; from the anterior margin of the foramen magnum to end of premaxillaries 93 mm.; zygomatic breadth 90 mm.

This Monkey is very common at Simla, and occurs in large troupes throughout the lesser ranges. In the station here it has become a perfect nuisance, and seems to be increasing enormously of late years. Blanford speaks of the existence of a *single* colony of these animals on the Jakko Hill (elevation 8,000 feet), but it would have been more correct to say that the hill holds *several* colonies.

Its courtship seems to be a prolonged affair, lasting for several days. Love-makings take place throughout August, September and November when numerous pairs may be observed constantly *in copula*. Between each act of cohabitation a good deal of imaginary lice or flea-picking, tickling of heads, and other domestic reciprocities are indulged in. The young are born about March, April and May. Personally I have never seen more than a single young one clinging to its mother, but have been assured on good authority that twins are occasionally born.

Some of the young females appear to breed in their third year.

There are two facts in connection with this Rhesus at Simla which are very noticeable, *viz.* (a) the enormous sizes to which some of the males attain; and (b) the long fur, which characterises them all, as compared with the miserable and bedraggled specimens found in the lower hills.

Regarded as sacred throughout these tracts, its shooting is strictly prohibited. A curious thing that I noticed was that these Monkeys in the more remote parts of the hills here had absolutely no idea of the significance of a gun! Another curious fact impressed on my attention is that some of the large males occasionally leave the herds for considerable periods at a time, and live in isolation. They generally take up their quarters near some cultivation, sneak unobserved into the fields in the early mornings, or late in the evenings, and do incredible damage, before they can be discovered or dislodged. These unsociable gentlemen are known to the hillmen as "Kalokurs."

I have witnessed several instances of tender devotion to their offspring in this species, and have great pleasure in putting the following incident on record, if only, as a set-off against their widely chronicled misdeeds.

During the course of a morning's walk here towards the latter end of May 1911, a small troupe of *S. rhesus* crossed my path, and I noticed one of the females dragging along with her the *remains* of what appeared to be a young monkey. These relics consisted of a highly decomposed skin, with a few bones protruding out of it. As this proceeding was



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somewhat unusual, I stood still and closely watched the old monkey. But I soon became aware of a most offensive odour pervading the surrounding atmosphere. The closer one approached the tree tenanted by the female and her ghastly treasure, the stronger did the stench become. I felt some hesitation at first in associating this with the defunct animal. Determined, however, in spite of the abominable smell, to put the matter beyond dispute, I followed, with little difficulty, the herd of animals as they were feeding from tree to tree; and the lapse of a very short time was quite sufficient to convince me that the disgusting smell proceeded from what was left of the dead monkey, and that the latter was beyond doubt the offspring of the old female. I frequently saw the mother tenderly fondle the remains of her young one, then hurriedly put them away from her on a branch, then snatch them up again, look at them in a most anxious manner, smell her hands, and utter a low pitiful moan. There was no doubt whatever that the smell affected her greatly, but she seemed either unable, or unwilling to account for it. How long the mother carried the remains of this loathsome corpse about with her it is of course impossible to say, but the strong affection and acute suffering displayed by this dumb creature for its progeny have, I must confess, left a very strong impression on my mind.

2. *PRESBYTIS SCHISTACEUS*, Hodgs.—*The Himalayan Langoor*.

(Blanford No. 13.)

(Simla = "Langoor"; Simla Hill States (Outer ranges) = "Gholee;" "Tulaundhar").

The following are the measurements of an adult male skull:—

From the supraoccipital to the end of premaxillaries 140 mm.; from the anterior margin of the foramen magnum to end of premaxillaries 101 mm.; zygomatic breadth 108 mm.

A large male shot some time ago, weighed exactly one maund.

Large herds of this fine Monkey, composed of both sexes and of all ages, are to be seen in the forests here throughout the year. I was much surprised to find it romping about on the banks of the Koshalla stream (elevation 2,300 feet), which is practically at the base of the Himalayas.

It is purely a tree-feeder, and its diet consists of acorns, wild fruits, buds, and flowers. It is not destructive to crops like *S. rhesus*, but at Simla it frequently steals into the gardens and orchards, and devours any fruit that it can find. Rose-buds are, I believe, readily eaten.

In addition to the low grunting note, it sometimes utters a loud shrill whistle, which is taken up by the whole herd: whether this whistle is used as a cry of alarm, or is simply uttered spontaneously, I have never yet been able to determine satisfactorily.

Blanford forgets to comment on the extraordinary acuteness of this animal's sense of hearing.

It has been asserted that some species of deer, chiefly Chital and Sambhar, are frequently to be seen near a herd of Langoors, but the exact object of this strange association is still a moot point. I once referred it to my friend, Mr. C. H. Johnstone, a good shikari and a keen observer, who has resided in these hills for many years, and I asked him if he had ever had the good fortune to witness this curious fact. He informed me that he had certainly seen Chital under fig and other jungle fruit trees (in the Duns) on which Langoors had been feeding, and judging from the numerous hoof-marks, he was inclined to think that the deer follow the monkeys about, not for the sake of protection, as has been thought, but to pick up the fruit that has fallen.



This Monkey runs with marvellous rapidity on all fours. It is easily tamed, if taken young, and makes a most interesting pet. It has not the vicious or depraved habits of *S. rhesus*.

So far as my personal observations go, the breeding season of this Langoor extends throughout the warm weather, as during this period the females are always to be seen with very young ones clinging to them. These very young ones are not seen during the cold months. Mr. Johnstone thinks that most of the young ones are born towards the latter end of June, and my own observations coincide with his in this respect. Neither of us have ever seen a Langoor in charge of two young ones, and we are both unanimous in thinking that they produce only one young at each birth.

#### ORDER—CARNIVORA.

##### 3. FELIS TIGRIS, L.—*The Tiger*.

(Blanford No. 29.)

The following facts have been collected in regard to the occurrence of the Tiger in these hills:

It is found, though very sparingly, in the Duns and lower hills of the Sirmur State. Owing to its increasing rarity, the State have been compelled absolutely to prohibit its shooting by sportsmen. A few tigers used to frequent the lower hills in the Bilaspur State (Simla Hill States), but they are now extinct there. Mr. Johnstone tells me that, about thirty years ago, tigers frequented the jungles on the S. E. of Kalka, abutting on the Mornee and Nahann (Sirmur) territory; and also the jungles in the vicinity of Pinjore (Patiala State). He has himself seen the dead bodies of two tigers that were shot within a few miles of Kalka, and on one occasion, while after peafowl in these jungles, he saw a tiger.

##### 4. FELIS PARDUS, L.—*The Panther*.

(Blanford No. 30.)

(Simla Hill States and Kulu = "Baragh," "Mirigh"; Kangra = "Bagh".)

This animal known to Europeans as the "Leopard," occurs throughout these tracts, but on account of its great acuteness and vigilance is seldom seen. It is most destructive to cattle, goats, sheep and dogs. I have not heard of a panther turning a man-eater in these hills.

Owing to want of sufficient material, I regret that I am unable at present to throw any light on the much disputed point as to whether there is only one or two forms of this animal. All the European sportsmen and Native Shikaris, whom I have consulted, are unanimous in thinking that there are two varieties, and will brook no contradiction on this point. Personally I have an open mind on the subject, but must confess that it is somewhat difficult to believe that the small cat-like, round-headed animal, of from 5-6 feet in length, is identical with the powerful panther, measuring almost 8 feet, and as huge as a tigress. It is a matter of considerable regret that sportsmen and others, who have shot numerous panthers in these hills, should not have availed themselves of the materials and facilities at their disposal to try and clear up this vexed question.

The classification proposed by Mr. Hicks in his book, "Forty years among the wild animals in India," for the two (?) species of this animal, do not appear to be founded on facts, so far as it relates to the caudal vertebrae. Major W. W. Keys reports (J. B. N. H. S., Vol. XXII, p. 189) the number of caudal vertebrae in a small female panthers as 23; last winter I counted 24 in



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a panther measuring 6'-1"; and Capt. A. H. Mosse found the same number in a female panther measuring 6'-2" (J.B.N. H.S. Vol. XXI, pp. 1319-1320): according to Mr. Hicks the number of caudal vertebrae in all these cases should have been 28. Capt. Mosse rightly observes that a single instance is sufficient to dissipate what he believes to be a myth. And as we have now no less than three specific cases against Mr. Hicks, it is time that his theories in regard to the classification of panthers, which savour of the dreamings of an idealist, should be dismissed from all scientific discussions in future.

While shooting in some of the Native States here, I examined the droppings of panthers on several occasions, and was much astonished to find the undigested quills of porcupines, which had been swallowed whole, and which appeared to have passed through the intestines entire!

Mr. Johnstone sent me the following interesting note on the habits of this species:—

"During the last thirty years or so, I have shot numerous Leopards in these hills, and I am firmly convinced that there are two varieties. One is a large animal of a light colour, and with more open spots; the other is a small animal, with a yellow ground, and closer spots. Leopards move about within a large area, visiting the jungles for miles around, and taking toll of the villagers' goats, cows and dogs, and often picking up a wild pig, or a "Kakur," or a porcupine as a change. I once shot a leopard that had porcupine quills embedded in its paws. I have frequently known Leopards to catch peafowl during the night by climbing up the trees on which these birds were roosting!

"These animals lie up during the day under some dense undergrowth on a hillside, or in caves, or under large rocks, and begin moving about at sunset. A leopard will visit a kill at any time from sunset to 9 P.M., and again from 2 A.M. to dawn, but I have never known them to turn up between 9 P.M. and 2 A.M."

"Leopards have two cubs at a birth. Judging from the size of the cubs in September, I should say that they are born about July."

5. FELIS UNCIA, Schreb.—*The Ounce.*

(Blanford No. 31.)

(Bashahr = "Thurwag"; Tibetan = "Shun".)

Skins of this handsome animal, the "Snow-Leopard" of sportsmen, are frequently brought from the Alpine tracts of the Bashahr State for sale in Simla.

6. FELIS BENGALENSIS, Kerr.—*The Leopard Cat.*

(Blanford No. 36.)

(Simla Hill States—"Ban Billa"; this term is also used for the next species; Kangra and Kulu—"Chitti Billi".)

Up to this I have only seen three specimens of this handsome Cat. One of these animals was an adult, and was captured in a large iron jaw-trap in the compound of a friend here. It had taken to visiting the poultry-yard, and had committed sad havoc among the fowls and ducks. I was unfortunately very ill at the time, and was unable to either measure or skin it. The second animal, a young kitten, sex ♀, about a couple of months old, was caught on the 11th August 1913, while wandering about on an unfrequented road in the station by some employes of the Simla Municipal Committee who generously presented it to me. I kept it alive for a few days, but it proved a more difficult captive to manage than I had anticipated. It was horribly savage, and would sit couched in a corner of its cage, and



growl at any passer-bye. It absolutely refused to touch food, and so forced me to take a step, which my inclination did not favour.

The third animal, an adult ♀ was shot by Dr. Kedar Nath, L.R.C.P.&S., in September last in the Dhamsi State, elevation 5,000 ft. Its measurements were: head and body 534 mm.; tail 330 mm.; ear 51 mm.; hindfoot 147 mm.; height 317 mm.

*Skull*: Basal length from foramen to the premaxillaries 80 mm.; width across the zygomatic arches 64 mm.; extreme length from supra occipital to end of premaxillaries 97 mm.

This species is undoubtedly rare in Simla.

7. *FELLIS AFFINIS*, Gray.—*The Jungle Cat*.  
(Blanford No. 41.)

The Jungle Cat is found throughout the outer ranges up to about 6,000 or 7,000 feet. It is frequently to be seen in the day-time near villages hunting for food.

8. *FELIS CARACAL*, Guld.—*The Caracal*.  
(Blanford No. 42.)

This animal has never to my knowledge been observed in any of the Simla Hill States, but it is interesting to note that General Osborn mentions it (*Kangra District Gazetteer*, 1904, p. 12,) as having been seen in the Kangra District, which is not very far off.

9. *PARADOXURUS NIGER*, Desm.—*The Indian Toddy Cat*.  
(Blanford No. 51.)

(Kangra—"Tutrial.")

Mr. Johnstone informs me that a few of these animals are to be found inhabiting the roofs of some old bungalows at Kalka. They issue forth every night, generally in pairs, occasionally in small parties of 3 or 4 at a time, and commit great depredations in the fruit gardens there. They are very partial to loquats, guavas, mangoes, and custard-apples, but do not touch the oranges.

10. *PAGUMA GRAYI*, Bennett.—*The Himalayan Civet*.  
(Blanford No. 55.)

(Kangra—"Dehun Kullu"; Kullu—"Bansuka").

*Skull measurements of an adult*: Basal length from foramen to premaxillaries 110 mm.; zygomatic arches 70 mm.; extreme length from supra-occipital to end of premaxillaries 123 mm.

Some years back when I took little interest in Zoology, I remember seeing three or four of these animals, which had been shot in the gardens of some residents here. They are very destructive to the local orchards.

These Civets are tolerably common in Simla, and appear to be chiefly frugivorous, but animal food is readily taken when procurable. Several of these animals have been captured here in traps baited with meat. The captives have a peculiar habit of snarling and spitting like a cat when any one happens to go near them.

It may be interesting to mention that this species apparently extends along the Himalayas much further westwards than Simla, as General Osborn records it (*Kangra District Gazetteer*, 1904, p. 13,) from Kulu, where it is known to the hillmen by the name of "Bansuka."

11. *MUNGOS*, sp.

Two kinds of Mongoose, a large one and a small one (*Mungos mungo* and



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*Mungos auropunctatus*?) are common around Kalka, but I have been unable to procure any specimens. I hope, however, to do so before long, and settle all doubtful points.

I have observed that the Mongoose found in parts of the United Provinces about the Azamgarh, Ballia and Gorakhpore Districts readily climbs a tree when pursued by dogs.

12. *HYAENA HYAENA*, L.—*The Striped Hyæna*.

(Blanford No. 66.)

(Simla Hill States = "Tarrak"; Kangra = "Tarrak"; Kulu = "Lagar Bagar").

The Hyæna has been seen in the hills at Dagshai, Sabathu and Kasauli. It is fairly common about Kalka. I have heard its unearthly yells on the top of the Shalli Peak (8,000-9,000 feet) in the depth of winter.

13. *CANIS PALLIPES*, Sykes.—*The Indian Wolf*.

(Blanford No. 68.)

(Simla Hill States (outer hills) and Kangra = "Bhagiara".)

The Indian Wolf has been seen in the neighbourhood of Kalka, but on very rare occasions. It does not appear to enter these hills.

14. *CANIS INDICUS*, Hodgs.—*The Jackal*.

(Blanford No. 69.)

(Simla Hill States = "Shial," "Phai," "Gidaree").

An adult ♂ shot in Simla on the 16th July 1912, measured as follows:—Head and body 812 mm.; tail 228 mm.; ear 64 mm.; height 482 mm.

*Skull*: From anterior margin of foramen magnum to anterior border of premaxillaries 146 mm.; from supraoccipital to end of premaxillaries 153 mm.; zygomatic breadth 97 mm.

The Jackal is common at all seasons in Simla, and abounds throughout the lesser ranges.

It is most destructive to the crops of Indian corn. When the female has young, she becomes exceedingly bold, and frequently carries off the lambs and kids belonging to the villagers in these parts.

It breeds in the hills during May-June, generally producing four young at each birth.

In addition to the usual diabolical yells, its peculiar cry "Phiou," is frequently heard in the heart of the station here, and, as suggested by Jerdon, is apparently an alarm note.

The skins of this animal shot in the neighbourhood of Simla, during the winter months, make excellent rugs.

I do not remember to have ever heard of a case of one of these animals having gone mad in the hills.

Some years ago I tamed a pair of Jackals, which were taken when quite young, and were brought up with the house dogs. One of the consequences of this close association was that these animals learnt to imitate the dogs in various ways. They would rush out of the house after strangers just in the manner of dogs, hunt in company with them, and once actually helped to kill a wild cat! They would often come to the table for scraps, but never got rid of that horrible habit of howling when they heard their brethren outside.

15. *CUON DUKHUNENSIS*, Sykes.—*The Indian Wild Dog*.

(Blanford No. 70.)

My object in mentioning this species in these notes is merely to draw attention to the statement made by Blanford that Wilson discovered a



breeding place near Simla. So far as I am aware the Wild Dog does not occur in any of these tracts, but the breeding place referred to is apparently the one mentioned by Colonel Markham in his "Shooting in the Himalayas," p. 175, as being situated high up the *Gangoutrie Valley*, which is in the State of Tehri-Garhwal.

16. *VULPES BENGALENSIS*, Shaw.—*The Indian Fox*.

(Blanford No. 72.)

This species is common around Kalka (2,400 feet), but does not enter the hills.

It breeds about February. I have never found more than two cubs at a time, and can corroborate what Jerdon says about the youngsters seldom leaving their earths till nearly full grown.

17. *VULPES VULPES MONTANA*, Pearson.—*The Hill Fox*.

(Blanford No. 75 [*partim*].)

(Simla Hill States, "Phaouta," "Chaura"; Tibetan—"Goanu".)

This very handsome animal is common at Simla, especially in the cold weather, and is found throughout these hills.

Mr. Johnstone informs me that he has seen it at Kalka during the winter months, and has actually shot it at that season as low down as Chandigarh (elevation 1,500 feet.)

It brings forth its young about April-May. Unlike the Indian Fox the cubs of this species, even when quite young, appear to come out regularly from their earths in the evenings, and have a romp with their mother. A gentleman here informs me that in 1912 he frequently came across one of these foxes, with two young cubs, on the top of the Tara Devi Hill (7,000 feet).

18. *MARTES FLAVIGULA*, Bodd.—*The Indian Marten*.

(Blanford No. 77.)

(Simla Hill States (outer ranges)="Kundrialoo," "Dikianee".)

The Indian Marten is tolerably common, at all seasons, throughout the outer ranges. I have seen it on the Shalli Hill (elevation 8,000 feet) in winter.

It is difficult to procure owing to its habit of being constantly on the move, and rapidly changing ground from one spot to another. It usually keeps in pairs, occasionally in small parties—as many as seven individuals have been noticed together—and is to be seen at any time of the day, and anywhere, in brushwoods, coppices, ravines, or by the sides of cultivation.

It is most destructive to game birds in these hills, and is one of the several frequent unwelcome visitors of the poultry yards in the station here. It is very frugivorous. It is an excellent tree climber, and a very fair sprinter on ground.

A young of this species, about a month or a month-and-a-half old, was caught in the station towards the latter end of July, but it died shortly afterwards.

The hillmen have a curious story about this animal. They say that when food gets scarce in the winter months, it visits the beehives in the villages, and secures the honey by inserting its tail into the exit holes, which are left in the walls for the bees. The honey is supposed to adhere to the long hairs of the tail, and the animal licks it off, and repeats the process till its appetite is satiated or nothing remains in the hive!

19. *MUSTELA*, Sp.—*Weasels, &c.*

A Weasel, belonging to the above Genus, was observed by me in the day, near my poultry-yard, during the winter of 1909; but it escaped



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before I could shoot it. Its colour, according to notes, taken at the time, was as follows:—

Upper parts, dark reddish-brown, lower parts, deep yellow. Total length about a foot-and-a-half, or a little less.

In my own mind I have no doubt that it was Blanford's No. 85.—*M. cathia*.

20. *MELLIVORA INDICA*, Kerr.—*The Indian Ratel*.

(Blanford No. 89.)

This species is found in the neighbourhood of Kalka, but is rare. It does not ascend the hills.

21. *LUTRA*, Sp.—*Otters*.

(Kangra and Kulu—"Udar.")

Knowing that specimens of Otters were a great *desideratum*, I made an exhaustive search last winter for them in some of the larger hill streams of the outer hills here, but without success. Not a single animal was seen anywhere. It is very possible that Otters occur in the upper portions of the Sutlej River here, and the necessity of further observations are indicated.

These animals are certainly found in the neighbouring district of Kangra, and the following is General Osborn's account of them:—

"There are two Otters found in Kangra: the first is the common Indian Otter (*L. nair*), which occurs right up to the foot of the Himalayas, and in the Sutlej and Bias Rivers; but in the mountainous part of the district, it is replaced by the Clawless Otter (*L. leptonyx*). \* \* \* The Common Otter, however, has been seen at Dharmasala" (*Kangra District Gazetteer*, 1904, p. 13).

22. *URSUS ISABELLINUS*, Horsf.—*The Brown Bear*.

(Blanford No. 97.)

(Kangra—"Brahbro," "Bhurlen"; Kulu—"Rattagai"; Tibetan—"Wampu").

The Brown Bear is found in the rugged and alpine tracts of the Bashahr State, but is rare. Skins are occasionally brought to Simla for sale.

23. *URSUS TIBETANUS*, Cuv.—*The Himalayan Black Bear*.

(Blanford No. 98.)

(Simla—"Bhaloo"; Simla Hill States—"Reech," "Banai"; Kangra—"Reech"; Kulu—"Chilagai").

The Himalayan Black Bear is fairly common in all the large forests of these hills. It is seldom found below 2,500 feet.

Mr. Johnstone remarks:

"This animal is tolerably common in the lesser ranges, and is most destructive to Indian corn, sugar-cane, wheat, honey and fruits. It is an excellent tree climber, and gets over rocky ground as fast as any Goral (*N. goral*). It frequently kills the goats belonging to the villagers, and I have known it to feed off the carcasses of cattle. It is exceedingly savage, and does not hesitate to maul any one taking him unawares. It does not maul to kill like the large cats. It sometimes charges if its path is obstructed. The charge is made on all fours, and when close to its victim, it rises and strikes either at the face or the head."

"Its sense of smell is very keen, but its sight is not good during the day."

ORDER—INSECTIVORA.

24. *PACHYURA*, Sp.—*Shrews*.

(Simla Hill States (outer ranges)—"Chuchoongar").

During the last two or three years I have captured at Simla, in traps,



baited either with bread or meat, several shrews, all of the same species, and belonging to the Genus *Pachyura*. These animals are not strictly nocturnal, as two or three were caught in the day. They live here in holes and crevices of walls in old godowns, kitchens, stables, etc.

The following are the measurements of three adults:—

Head and body 108 mm.—119 mm.; tail 66 mm.—71 mm.; hindfoot 20 mm.; ear 12 mm.—14 mm.

The following are the measurements, etc., of two adult females, captured in Simla, on the 24th and 28th August 1913:—

Head and body 110 mm.—125 mm.; tail 64 mm.—71 mm.; hindfoot 18 mm.—19 mm.; ear 12 mm.—13 mm.

Basal lengths of the two skulls 25—26 mm.

Six mammæ—all inguinal; three on each side. The specimen captured on the 24th August contained three fully developed young in her. Another female captured on the 23rd June 1912, and which was unfortunately not measured, was also pregnant. From this it seems pretty clear that this Shrew breeds throughout the summer and early autumn months, and probably has at least two broods in the year.

I have already sent two specimens (in spirits) of this animal to Mr. Kinnear, Bombay Natural History Society, and these are doubtless available to experts for examination and identification. At present I have ten specimens (5 adults in spirits; 3 young in spirits; and 2 adult skins), and am prepared to send them to anyone in need of further material for working out this little known species.

I take this opportunity of pointing out that the Shrew, which is so common in Calcutta (Genus *PACHYURA*, sp. ? Head and body 178 mm.; tail 90 mm.), is also not purely nocturnal, as I have caught it in traps, baited with bread, *in the day*. On the 12th December 1912, I examined a pregnant female of this species, and found that she contained 3 fully developed young.

#### ORDER—CHIROPTERA.

##### 25. *PTEROPUS LEUCOCEPHALUS*, Hodgs.—*The Flying Fox*.

(Blanford No. 134 [*partim*]).

A Flying Fox, apparently belonging to the above form, is common all round Kalka, which is at the foot of the hills. It generally keeps below 2,500 feet, but last October, while walking about in the verandah of my bungalow at Simla after dinner, I was much surprised to see one of these bats fly past overhead at a low height. It was a bright moonlight night, and there was no mistaking it. It appeared to have come from a S.-E. direction. Previous to its appearance here, we had been enjoying a spell of particularly fine weather, and this makes it most difficult to conjecture how this animal strayed so far from its regular haunts, and found its way up here.

Since writing these notes my friend, Alec. Jones, informs me that he has seen several of these bats near Sairee which is only about nine miles from Simla.

The curious superstition in Seonee noticed by Sterndale in regard to the beneficial effects to be derived from tying the bones of this bat round the legs as a cure for rheumatism is, I may mention, also prevalent in parts of the United Provinces, but the people there are very careful to use only the bones from the wing.

In the Bird and Animal Market in Calcutta, I noticed several large cages full of Flying-foxes, and on my inquiries elicited the surprising information that they were bought in large numbers by the Chinamen, who



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esteemed them a great delicacy. A large plump Flying-fox usually retailed for about six annas!

On examining some of these bats in Calcutta, I found that they generally had one or two curious spider-like parasites, belonging to the Genus *NYCTERIBIA*, adhering to their bodies.

26. *RHINOLOPHUS TRAGATUS*, Hodgs.—*Hodgson's Horse-shoe Bat*.

(Blanford No. 157.)

(Simla Hill States (outer ranges) = "Chamchira"; this term is applied to all Bats).

*Measurements:*

Sex—♂ (4 adults). Head and body 61 mm.—67 mm.; tail 36 mm.—38 mm.; hindfoot 13 mm.—14 mm.; ear 27 mm.—28 mm.

Sex—♀ (2 adults). Head and body 63 mm.—64 mm.; tail 33 mm.; hindfoot 13 mm.—14 mm.; ear 25 mm.

In August 1912, I found a colony of these Bats inhabiting the attic of an office at Simla (7,000 feet), and captured several specimens. These animals always issued forth at dusk, in large numbers from their roosting places, and after flying slowly round the building, at only a short distance from the ground, used to disappear into the neighbouring forests.

Their diet is apparently found close to the ground, as I frequently observed them hovering about near the roots of small bushes on the hillsides.

In order to study the habits of these bats, I kept some of them alive for short periods in a box with a glass cover, and noticed that the captives retained their ears in a constant state of vibration: when hanging downwards in the box, their interfemoral membranes were always carefully preserved by being neatly folded backwards. They were very pugnacious, and were constantly biting each other. The immature specimens are *darker* in colour than the adults. I can corroborate what Hodgson says about this species *not* being migratory; but am *not* quite sure about it *not* hibernating, so far as Simla is concerned at any rate.

I got several curious spider-like parasites from the bodies of these Bats.

27. *NYCTALUS LABIATA*, Hodgs.—*The Noctule Bat*.

(Blanford No. 181 [*partim*].)

Measurements of an adult ♂:

Head and body 84 mm.; tail 49 mm.; hindfoot 10 mm.; ear 20 mm.

Mr. Kinnear kindly identified the above specimen for me. He states that this is the eastern representative of *N. noctula*.

This Bat is a forest loving species, and I have generally found it solitary in natural crevices and holes of trees. Judging from the amount of dung in its abode, it apparently lives in the same spot for a considerable period. Its flight is rapid and strong. As stated by Blanford, it has a most unpleasant odour.

28. *PIPISTRELLUS COROMANDRA*, Gray.—*The Coromandel Pipistrelle*.

(Blanford No. 187.)

(*Vide* Wroughton in J. B. N. H. S. Vol. XXI, p. 1179).

This Bat is very common in Simla (7,000 feet), and is the one that frequently comes into the houses at nights. It is not a forest haunting species, but, as observed by Blanford, is essentially a house bat, hiding in



crevices and holes of the roofs of bungalows, old godowns, etc. It is generally the first to issue forth in the evenings, and flies at various heights with rapid and irregular twists and turns. It disappears entirely during the cold months, and must therefore hibernate in these parts during that period. A female captured towards the latter end of May had a single young one sticking to her.

29. *MYOTIS BLYTHI*, Tomes.—*Himalayan Mouse-Eared Bat*.

A single specimen of this rare bat was captured in August 1912, sticking to the roof of a small cave, elevation 6,000 feet, in the neighbourhood of Simla.

Mr. Oldfield Thomas, F. R. S., F. Z. S., very kindly identified the specimen, which is now in the British Museum. He remarks *in epist.* :

"The Bat you have sent is a good thing, and I at first thought it was new. It is *Myotis blythi*, Tomes, wrongly put as a synonym of "*Vespertilio murinus*" (*Myotis myotis*) by Blanford. Only two examples of this Bat have been got before; one, the type, which is in the British Museum, and, the other, procured by Abbott, the American, in Kashmir, and now in Washington".

30. *MYOTIS MURICOLA*, Hodgs.—*The Mustachioed Bat*.  
(Blanford No. 212.)

I found a colony of these Bats inhabiting the porch of my bungalow at Simla, and procured several specimens, which are now in the Bombay Natural History Society's Museum. These animals were always very active during the summer months; issuing forth about dusk, and flying at varying heights with rapid twists and turns. They seemed to hibernate for a good portion of the year, as they invariably disappeared about the middle of August, and were not seen again till late in the following spring. They breed during May and June. Several females were captured with single young ones sticking to them. The young are born naked and blind.

31. *NYCTALUS MONTANUS*, Barrett-Hamilton.—*The Eastern Leisler's Bat*.

On the 2nd September last I captured a pair of these Bats in the roof of my bungalow at Simla (7,000 feet). They always issued forth at dusk, and after flying several times at low heights round the house, used to disappear on the hillsides.

Their measurements were :

Sex ♂ (*adult*).—Head and body 64 mm.; tail 38 mm.; hindfoot 10mm.; ear 12mm.

Sex ♀ (*adult*).—Head and body 65 mm.; tail 42 mm.; hindfoot 10 mm.; ear 14 mm.

Mr. Oldfield Thomas, F.R.S., F.Z.S., was kind enough to identify these specimens for me. He remarks :

"This Bat is the Indian representative of the European *Nyctalus leisleri*. It has recently been named *N. montanus* by Barrett-Hamilton, and may be called by that name for the time being."

"You are evidently in a very interesting region for Bats, getting these Indian representatives of European forms, and I hope you will go on collecting."

ORDER—RODENTIA.

32. *PETAURISTA FULVINUS*, Wroughton.—*The Simla large Flying Squirrel*.

(Simla Hill States (outer ranges) = "Een"; this term is applied to all Flying Squirrels; Kangra = "Banchiri," "Gharini"; Kulu = "Ju".)



## NOTES ON MAMMALS FOUND IN THE SIMLA DISTRICT. 741

## Measurements :

Sex—♂ (*adults*). Head and body 344 mm.—385 mm.; tail 452 mm.—456 mm.; hindfoot 71 mm.—76 mm.; ear 43 mm.—50 mm.

Sex—♀ (*adults*). Head and body 356 mm.—388 mm.; tail 433 mm.—476 mm.; hindfoot 73 mm.—75 mm.; ear 43 mm.—46 mm.

The extreme lengths of five skulls, from the supra-occipitals to the end of nasals, vary from 71 mm. to 73 mm.; and the breadths across the zygomatic arches from 46 mm. to 50 mm.

This handsome Squirrel is tolerably common in all the forests here, and generally keeps above 6,000 feet. It usually lives by itself in the holes of large trees, but it is sometimes found in small colonies inhabiting the roofs of bungalows, godowns, etc. Its diet consists chiefly of acorns and other wild fruits: the mulberries and walnuts, when in season, are a great stand-by. Like the next species, it is confiding in its habits, and visits the trees in the compounds here freely. When feeding it is much noisier in its movements than *Sciuropterus fimbriatus*, and when both these species happen to meet on the same branch, a fight generally ensues.

Its cry is a mournful "Kó-ó-oh", repeated several times.

I have been unable to ascertain when it breeds.

According to Blanford this Squirrel is said to hibernate in Kashmir, but it certainly does not do this here, as I have procured specimens at all seasons.

When collecting these animals, I was much struck with the curious fact that the males predominated enormously over the females in numbers; the proportion works out to about 8 in 1. The same was the case as regards the next species.

These animals can easily be tamed, even if taken when they are full grown.

The following facts showing that the death-rate is sometimes selective among species differing little from each other in habits, came under my observation a few years ago, and deserve notice:—A colony of these Squirrels inhabited the loft of my bungalow in Simla for several years. During the summer of 1911, I noticed that they began to die off one after another, without any apparent cause. This led me to examine some other haunts of this species which I had previously discovered at different parts of the station, and where, to my surprise, I found evidence of a similar high rate of mortality. In the neighbouring jungles some more dead bodies of these Squirrels were discovered. It was out of the question to take any measurements of the dead animals, as in all cases the remains were in a highly decomposed state; but there were two points which struck me at the time as worth noting, viz. (*a*) all the Squirrels which had died belonged to one species (*P. fulvinus*); the other species of Flying Squirrel, which abounds here, did not seem to be affected in anyway; and (*b*) only the very old individuals of *P. fulvinus* appeared to have succumbed to the disease. It was curious that not a single dead young or immature one was found anywhere, though special search was made for these.

33. *SCIUROPTERUS FIMBRIATUS*, Gray.—*The Small Flying Squirrel*.

(Blanford No. 233.)

## Measurements:

Sex—♂ (*adults*). Head and body 227 mm.—267 mm.; tail 242 mm.—267 mm.; hindfoot 45 mm.—50 mm.; ear 40 mm.—41 mm.

Sex—♀ (*adults*). Head and body 231 mm.—254 mm.; tail 229 mm.—267 mm.; hindfoot 51 mm.—55 mm.; ear 41 mm.—47 mm.



The extreme lengths of five skulls, from the supra-occipitals to the end of the nasals, vary from 55 mm. to 59 mm.; and the breadths across the zygomatic arches from 33 mm. to 35 mm.

This is the common Flying Squirrel of Simla. Its habits resemble in many respects those of *P. fulvius*, but it is far more active, and is generally the first to issue forth in the evenings in quest of food. It lives in pairs in the holes of trees and roofs of buildings, and breeds about September—October, producing 3 or 4 young at a birth.

When feeding, it is silent and stealthy in its movements, and is consequently difficult to detect. It seldom stays long in one spot, but passes on rapidly by leaps or flights, from one tree to another. Some of the flights taken by this animal are immense, and remind one more of a bird gliding swiftly through the air than an animal. In one case I measured the distance, and found that the Squirrel had covered exactly 80 yards!

All the above mentioned specimens correspond exactly with Blanford's description of this species, but I have in my collection a skin of one of these Squirrels—an adult ♂ which is somewhat different in colouration from *S. fimbriatus*, and which may, perhaps, belong to another species? The upper parts, especially near the hind-neck, have a tinge of rufous-brown, and the tail is reddish-brown, darker on the tip.

The following are its measurements:

Head and body 241 mm; tail 241 mm; hindfoot 45 mm; ear 40 mm.

*Skull measurements:*

Extreme length, from supra-occipital to end of nasals 60 mm.; zygomatic breadth 33 mm.

This specimen is available for examination. It is the only one of its kind that I have ever seen in Simla. It was procured on the 18th June last, along with two specimens of *S. fimbriatus* from which it does not appear to differ in any way in its habits.

34. *FUNAMBULUS PENNANTI*, Wroughton.—*The common Five-striped Squirrel.*

(Blanford No. 253 *partim*.)

(Simla Hill States (outer ranges) = "Karto")

Measurements of an adult ♂.

Head and body 140 mm.; tail 102 mm.; hindfoot 38 mm.; ear 19 mm.

This Squirrel is very common about Kalka. It penetrates the outer hills to about 4,500 feet.

It lives entirely on seeds, fruits, berries, etc., and I doubt whether it ever destroys the eggs or young of birds, as has been alleged. Its nest is a large bulky structure, composed of rags, "sun," and other fibrous matters, and is generally placed in the branch of a tree, sometimes between the rafters and beams of godowns and bungalows, and sometimes in holes of walls. It seems to breed at very different times in various parts of its range. Round about Kalka, Mr. Johnstone informs me that it brings forth its young, usually 4 in number, during March and April. In the United Provinces I have found the young in May and June. In Calcutta I noticed several young ones being hawked about for sale in the Market there on the 22nd November, and in the Kanchrapara District, (24 Parganas), I saw one of these animals carrying building materials to its nest on the 4th December.

35. *VANDELEURIA OLERACEA*, Benn.—*The Tree Mouse.*

(Blanford No. 270.)

At Kalka, on the 18th January, I found a small colony of three of these



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mice in a nest made of grass, which was placed in the natural crevice of a large Peepul Tree (*F. religiosa*), not more than three feet from the ground. I sent these animals for identification to Mr. Kinnear, and he remarks in epist:—

"The skins look rather darker than Deccan specimens. Hodgson distinguished the Nepal form as "*dumeticola*".

The specimens are available for examination.

In the Journal of the Bombay Natural History Society, Vol. XXI, p. 823, Wroughton uses *V. oleracea*, Benn. for the Dekkan Tree-Mouse, and states that *V. dumeticola* "must stand for the northern form (dark but bright tawny) which undoubtedly is distinct from *oleracea*." The specimens, which I have procured appear to belong to the northern form.

*Measurements of a ♀ (adult).*—Head and body 78 mm.; tail 113 mm.; hindfoot 19 mm.; ear 15 mm.

I have subsequently ascertained that this Mouse is common at Kalka.

36. *EPIMYS VICEREX*, (Bonhote.):

(Simla = "Chuha" (applied to all rats); Simla Hill States (outer ranges.) = "Moosa" (applied to all rats.)

*Measurements of two ♀s—(adults).*

Head and body 153 mm.—159 mm.; tail 146 mm.—198 mm.; hindfoot 31 mm.—32 mm.; ear 20 mm.—26 mm.

This is the common house-rat in Simla.

A few years ago I had occasion to have several hundred of these animals trapped, and found that the males predominated over the females in the proportion of about 3 to 1. The males in this species appear to be very pugnacious, for on examining a large number of the captives, I noticed that their bodies and legs were covered with big scars and bites—apparently the results of love encounters.

The following are the results of my investigations as regards the breeding of this rat:

17th July—6 young; 4th August—6 young; 15th August—5 young; 19th August—2 young; 2nd September—6 young.

37. *EPIMYS RUFESCENS*, (Gray)—*The Common Indian Rat*.

(Blanford No. 272).

In addition to the above species, there are two other varieties of rats which are found in the Simla District and Simla Hill States. As the taxonomic value of the belly colour of these Rats has not yet been determined (*vide* Journal of B. N. H. S., Vols. XXI, pp. 1189-1190, and XXII, pp. 54-55), I have provisionally lumped them under *Epinys rufescens*.

The two varieties are:

- (a) with light grey underparts, and
- (b) with dark underparts.
- (a) Occurs in Simla, but is decidedly rare. A special search was made for specimens at the foot of the hills, but not a single one was found.
- (b) Abounds at Kalka (2,400 ft.), and at the foot of the hills.

*Measurements of (a).*

*One specimen—Sex ♀ (adult).*—Head and body 168 mm; tail 223 mm; hindfoot 35 mm; ear 23 mm.

*Measurements of (b).*

*Two specimens—Sex ♂ and ♀ (adults).*—Head and body 153 mm; tail 191 mm—204 mm; hindfoot 28 mm—31 mm; ear 21 mm—22 mm.

Specimens of the above are available for examination.



38. *MUS URBANUS*, Hodgson—*The Himalayan House Mouse*.

(Blanford No. 283.)

(Simla Hill States (outer ranges) = "Moosarie.")

*Measurements:*

*One specimen*—Sex ♂ (*adult*). Head and body 71 mm.; tail 82 mm.; hindfoot 16 mm.; ear 18 mm.

*Five specimens*—Sex ♀ (*adults*).—Head and body 73 mm.—83 mm.; tail 77 mm.—85 mm.; hindfoot 16 mm.—19 mm.; ear 14 mm.—16 mm.

This is the common House Mouse at Simla.

Two pregnant females examined on the 17th August and 29th November contained 5 fully developed young each. Another pregnant female examined on the 24th August contained 4 young.

The normal number of mammae in this species appears to be 10 (5 on each side), but in two specimens I find that one has 11 mammae (5 on one side and 6 on the other), and the other only 9 (4 on one side and 5 on the other).

39. *GUNOMYS*, Sp.

On the 1st July 1912 a rat (sex ♂) belonging to the above Genus was caught in the bazaar at Simla, but unfortunately the skin was spoilt, and it is not possible to say for certain now what it was. Mr. Kinneear, who kindly examined the decomposed skin, thinks that it may have been *G. Wardi* (J. B. N. H. S., Vol. XVIII, pp. 744-745). Its measurements were: Head and body 242 mm.; tail 178 mm.

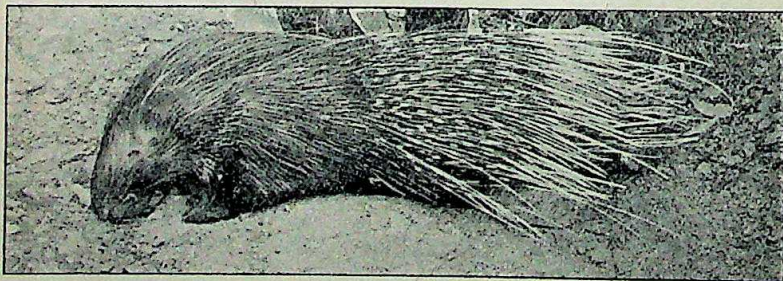
This is the only one of its kind that I have ever seen up here.

40. *HYSTRIX LEUCURA*, Sykes.—*The Indian Porcupine*.

(Blanford No. 315.)

(Simla Hill States (outer ranges) = "Sahil"; Kangra = "Seh.")

The Indian Porcupine ranges as high as 7,000 feet in these hills. It has been shot on several occasions in the gardens of the residents here. Judging from the large number of quills which I have picked up at different parts of the station, I should think that it is much commoner than is supposed, but being so essentially nocturnal in its habits, it is seldom seen.



The accompanying photograph is of an adult Porcupine shot on the Tara Devi Hill (7,000 feet).

It is most destructive here to Indian corn, and to potato and other vegetable crops.

In the hills this animal appears to make its home in natural caves and in crevices of rocks, and does not burrow as in the plains.



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It has been asserted that the Porcupine has the power of discharging its quills with great force, but is not able to direct them, and it would be interesting to know whether any naturalists have ever observed this action? I have been present at the deaths of several Porcupines, which have been cornered by dogs, and brought to bay, and have certainly seen them charge backwards, with erected spines, as related by Blanford, but have never known these to be thrown at their foes.

There is a very curious story prevalent in the United Provinces to the effect that these animals carry water in the quills of their tails to their young!

41. *LEPUS RUFICAUDATUS*, Geoff.—*The Common Indian Hare*.

(Blanford No. 320.)

(Simla Hill States = "Phuraroo"; Kangra = "Seru.")

In view of Wroughton's remarks in J. B. N. H. S., Vol. XXII, p. 57, I feel somewhat doubtful about mentioning this species under the above name, but all the specimens which I have procured in the hills here correspond with Blanford's description.

This Hare abounds in the submontane tracts, and penetrates into the outer ranges as high as 6,000 feet. I have seen specimens, which had been shot in the neighbourhood of Simla.

It is generally found solitary.

Mr. Johnstone remarks *in epist.* as regards its habits:

"This Hare is most destructive to young wheat, barley, and gram, but prefers nibbling "doob" grass to crops after a certain toughness of stalk has been attained."

"There is only one time of the year when it does not breed, and that is during July. It produces two at a birth on an average every third week."

## ORDER—UNGULATA.

42. *ELEPHAS MAXIMUS*, L.—*The Indian Elephant*.

(Blanford No. 332.)

The Elephant was formerly abundant in parts of the Sirmur State, where it was sometimes captured. A few still occasionally visit the Doons of that State for short periods.

43. *PSEUDOIS NAHURA*, Hodgs.—*The Baral*.

(Blanford No. 346.)

(Bashahr = "Wa"; Lahul = "Miatu"; Tibetan = "Napoo".)

This Sheep occurs in the Bashahr State, but keeps above elevations of 10,000 feet.

Specimens with 25"—26" horns are now considered good trophies.

In his excellent little book, "The Sportsman's Manual in Kulu, Lahaul, etc.," 1907, Colonel R. H. Tyacke has given the maximum lengths of horns of some Himalayan species of game which sportsmen are likely to get at the present time, and it is difficult to dispute his figures. He remarks:—

"It may be laid down that the following are the limits to the sizes of heads that any sportsman is likely to get, and if he succeeds in reaching this limit, he may be esteemed very fortunate:—

Ibex	..	..	..	50 inches.
Tahr	..	..	..	14 "
Serow	..	..	..	12 "
Goral	..	..	..	9 "
Baral	..	..	..	26 "
Barking Deer	..	..	..	8 "



44. CAPRA SIBIRICA, Meyer.—*The Himalayan Ibev.*

(Blanford No. 348.)

(Kunawar = "Buz"; Kulu = "Tagrole"; Tibetan = "Skeyn," "Kiu".)  
Only found in the Kunawar Division of the Bashahr State.

The horns of this animal are considered by the local people as very appropriate for the adornment of temples.

45. HEMITRAGUS JENLAICUS, H. Smith.—*The Tahr.*

(Blanford No. 350.)

(Bashahr = "Jhula," "Tahrni," "Esbu"; Kangra and Kulu = "Kurt" or "Karth".)

Common in the Rohru Tahsil of the Bashahr State.

46. CAPRICORNIS SUMATRAENSIS RODONI, Pocock.—*The Chamba Serow.*

(Blanford No. 352 (*partim*).)

(Simla Hill States (interior) = "Aimu"; Kulu = "Yamu".)

Few sportsmen in these hills have hitherto troubled themselves much about the Serow, and have, I am sure, always been under the impression that the same form ranges from Kashmir to Burma. Mr. R. I. Pocock's most valuable paper in the last Journal has, however, opened our eyes to the fact that there are apparently several types of this curious animal, and that a great deal yet remains to be learnt about it.

I take it that the Serow found in the Simla Hills belongs to the Chamba race (*rodoni*), but hope to clear up the point definitely before long. Specimens of this animal have occasionally been procured in the rocky and densely wooded hills to the north of Simla. It is tolerably common in the more remote parts of the interior.

A couple of years ago one of these animals, a straggler, was shot close to the Military Cantonment of Jutogh.

47. NEMORHEDUS GORAL, Hard.—*The Grey Himalayan Goral.*

(Blanford No. 354.)

(Simla Hill States = "Ghol"; Kangra = "Bun Bukri", "Pij"; Kulu = "Ban Bukri".)

The Goral or Himalayan Chamois is found throughout the outer ranges, and extends as low as 2,500 feet.

It is somewhat gregarious, being usually found in small parties of 2, 3 or 4, but in localities where they are plentiful, very much larger parties are met with. I remember some years ago counting, in succession, no less than 21 Gorals, which were got off a range of cliffs on a single hill, in one of the Native States here.

If alarmed or startled, the animals usually scatter in all directions, and their subsequent movements are quite independent of each other.

When taken young, the Goral makes a very interesting pet.

Blanford states that Jerdon's account of the habits of this animal is difficult to improve upon, but I must confess that I was greatly fascinated by Colonel Markham's account in his charming book, "Shooting in the Himalayas," London, 1854.

My ideal of Goral shooting is not to attempt to stalk them, and thus take them unawares; but, if the ground is favourable, to take up a position either opposite or at the bottom of a precipice or cliff, known to be haunted by these animals, and to have them deliberately driven across the face of it. This method, while avoiding all unnecessary climbing and consequent fatigue, not only affords the Gorals a fair chance of escape, but at the same time gives the naturalist-sportsman an excellent idea as to the manner in which these animals are able to make their way across the most difficult places.



NOTES ON MAMMALS FOUND IN THE SIMLA DISTRICT. 747

48. BOSELAPHUS TRAGOCAMELUS, Pallas.—*The Nilgai or Blue Bull.*

(Blanford No. 355.)

(Kangra—"Ban Gai," "Roj.")

Occasionally found in the jungles below Kalka, but it is very rare.

49. TETRACEROS QUADRICORNIS, Blainv.—*The Fourhorned Antelope.*

(Blanford No. 356.)

(Native name "Chousingha.")

Found in the Sirmur Doons; also in the Marna jungles (Patiala State), below Kalka. Rare in the latter locality.

50. ANTILOPE CERVICAPRA, L.—*The Black Buck.*

(Blanford No. 357.)

(Kalka and Kangra—"Hiran.")

A few Black Buck are to be found below Kalka, near Chandigarh, but are not worth shooting, as the horns rarely exceed 18 inches in length.

51. MUNTIAcus VAGINALIS, Bodd.—*The Barking Deer.*

(Blanford No. 362.)

(Simla, Simla Hill States, Kangra, and Kulu—"Kakar".)

Whether the W. Himalayan form is identical with, or separable from, the Bengal "Kakar" has not been determined at present (*vide* Wroughton in J. B. N. H. S., Vol. XXI., p. 825). For purposes of these notes, it has been assumed that the two animals are identical.

The Barking Deer abounds throughout most of the wooded ravines, glens and coppices in the lower hills, including the Siwaliks. It is seldom seen above an elevation of 7,000 ft. Its loud barking cry is frequently to be heard in the ravines in the station here.

As is well known this species is solitary in its habits, but it is by no means unusual to find several individuals, whose movements are independent of each other, inhabiting the same patch of jungle. My friend, Mr. G. M. Coates, informs me that no less than 24 Kakur were bagged at various intervals, during the shooting season of 1912-1913, in a small jungle about six miles distant from Simla, by sportsmen here; and a most curious feature of this large aggregate bag was that all but 4 were males! In the previous year also a large number were shot in the same jungle, and on that occasion the majority were females.

This species is very constant to its haunts, and if not disturbed or frightened, seldom quits them. If one of them is shot in a particular ravine, its place appears to be shortly afterwards taken by another one.

It feeds in the mornings and in the evenings. It drinks daily at the latter time. It usually rests under a bush, or at the roots of a tree, and the same lairs appear to be used for long periods. Another peculiarity which deserves notice is its habit of depositing its dung in practically the same spots day after day.

In the hills it breeds during June-July, generally producing one, sometimes two young, at each birth.

The best pair of horns that I have yet seen belonged to an animal shot by Mr. W. N. Leicester in 1896 in the Dhami State. They measure—

From base to tip along curve  $8\frac{1}{2}$  inches and from bur (pedicel not included)  $5\frac{1}{2}$  inches.

I can fully corroborate what Blanford says in regard to the buck using its canine teeth in defence. Some years ago, a couple of my terriers cornered a Kakur in a ravine here, and one of the dogs was badly ripped open in three places. The wounds were about 4 inches in length, and as clean as razor cuts.



52. *RUSA UNICOLOR*, Bechs.—*The Sambhar*.  
(Blanford No. 367.)

This species keeps to the low hills and forests in the submontane tracts. Considerable numbers of these animals are to be found in the Rawin State, where most of the temples are adorned with its horns.

Last winter I came across a herd consisting of about 7 or 10 does wandering about in some scrubby jungles near Koti (elevation 3,600 feet) in the Bhaghat State.

53. *AXIS AXIS*, Erxl.—*The Spotted-Deer*.  
(Blanford No. 368.)

(Kangra = "Bara Singha," "Jhank".)

Found in the Sal Forests of the Sirmur Doon, and also in Raithur (Patiala State).

54. *AXIS PORCINUS*, Zimm.—*The Hog-Deer*.  
(Blanford No. 369.)

The Hog-Deer occurs in the tropical portions of the Sirmur State.

55. *MOSCHUS MOSCHIFERUS*, L.—*The Musk-Deer*.  
(Blanford No. 370.)

(Simla Hill States = "Kastura", "Moskinafa"; Kangra = "Kastura," "Raunsa"; Kulu = "Beena.")

This Deer is found in most of the forests in the interior of these hills, but is gradually becoming rare. It generally keeps above 8,000 feet.

56. *SUS CRISTATUS*, Wag.—*The Indian Wild Boar*.  
(Blanford No. 374.)

(Simla Hill States, Kangra, and Kulu = "Sur.")

This species is perhaps the most numerous of all the game animals in the lower hills from about 5,000 feet downwards. It abounds in the Simla Hill States of Bhaghat, Bhajji, Baghal, Bilaspur, Nalagarh and is most destructive to crops.

Mr. W. N. Leicester, who has shot for many years about these hills assures me that Pigs are frequently to be found as high as 7,000 feet. He has seen a few of these animals near the "Catchment area" here, and some close to Narkanda.

So far as my observations go there seems to be only one species of wild hog in these hills; but according to General Osborn two varieties are found in the Kangra District. He remarks:—

"In these hills the boars grow to a very large size, and are very destructive to the crops. The following measurements have been obtained by a well-known sportsman: height at the shoulder, 36 inches; length from tip of nose to end of tail, 6 feet 2 inches; length of tail, one foot. There is another variety occupying the same jungles, which is only three-quarters the size of the large kind. There is no other specific difference between them. The *shikaris* of the Kangra country declare that the smaller variety of wild boar is more savage and dangerous, when wounded, than the larger kind."

In the lower hills here the Pig breeds about the beginning of the rains, generally producing 4 to 8 young at a birth.





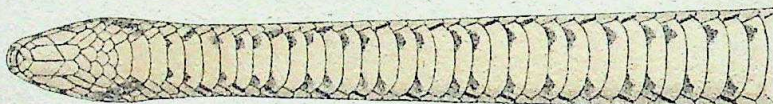




1.



1a



1b.



2.



2a



2b

J.G. del.

THE COMMON INDIAN SNAKES. (Wall)

1. *Simotes arnensis*, harmless, nat size.

2. *Simotes albocinctus*, harmless, nat size.

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J. Green, Chromo.



A POPULAR TREATISE ON THE COMMON INDIAN  
SNAKES.

ILLUSTRATED BY COLOURED PLATES AND DIAGRAMS

BY

MAJOR F. WALL, I.M.S., C.M.Z.S.

Part XX (with Plate XX, Text figure and Map.)

(Continued from page 568 of this Volume.)

Both the subjects of this paper belong to the genus *Simotes*, one of the many into which aglyphous or fangless colubrines are divided. The genus contained 22 species when Mr. Boulenger's Catalogue appeared in 1894. Its representatives are denizens of the Southern part of the Asiatic Continent from the Punjab to Southern China, and range through the Malayan Archipelago from Sumatra as far East as Timor, and as far North as the Philippines and Formosa. Of the 22 species no less than 11 occur within our Indian Dominions.\*

The types are the Indian *arnensis*, the Malayan *octolineatus*, and the Malayasian *purpurascens*.

## SIMOTES ARNENSIS (SHAW).

## THE COMMON KUKRI SNAKE.

*History*.—Seba appears to have been the first to depict this snake, his illustration dating back to the year 1735. Later in the same Century—in the year 1796—Russell figured and remarked upon it twice in his first volume (Plates XXXV and XXXVIII).

*Nomenclature*.—(a) *Scientific*.—Dumeril and Bibron are responsible for the generic name which is from the Greek “simos” a snub-nose and refers to the rostral shield which is reflected back on to the snout to a remarkable degree in all the kukri snakes. (See figure A of Diagram.) Arni from which the snake derives its specific name is a town close to Arcot in the Madras Presidency, where the subject of Russell's Plate XXXV was captured.

(b) *English*.—The common kukri snake seems to me an appropriate name for it. As already mentioned in a previous article of this series (Vol. XIX, p. 556) the name is suggested by the blade

\*It is extremely dubious whether the two genera *Oligodon* and *Simotes* established by Boie and Dumeril and Bibron respectively, and upheld by Dr. Günther and Mr. Boulenger deserve separate recognition. The characters made use of to distinguish them based mainly on the presence or absence of palatine orpterygoid teeth are not tenable. I have skulls of 11 species (6 *Simotes* and 5 *Oligodon*) and can find no important constant differences between them. A study of the epidosis too fails to reveal any single character, or combination of characters that can justify the division. I feel certain therefore that the two will have to be amalgamated under Boie's title *Oligodon* which is the older.



like character, and peculiar shape of the posterior maxillary teeth in all the species of *Simotes* and *Oligodon*.

(c) *Vernacular*.—Russell says it is called “katla tutta” in the Vizagapatam District, and Mr. Muir tells me that in Bengal around Kalna it is called “sanka.” I have heard no special native names for it myself.

*Identification*.—It is not an easy matter to distinguish this from some other kukri snakes to which it bears considerable resemblance in colour and markings. It is safer to identify the snake by attention to scale characters only. The brevity of the sutures between the internasal and præfrontal fellows, are, I think, if taken together, sufficient to establish the genus as either *Simotes* or *Oligodon*. The internasal suture is half or less than half the internaso-præfrontal suture, and the præfrontal distinctly less and often but half the præfronto-frontal suture. In order to distinguish *arnensis* from the other kukri snakes the following points must co-exist:—(1) a divided anal shield, (2) presence of loreal, (3) 7 supralabials, and (4) more than 40 subcaudals, of course taking care to see that the tail is not imperfect.

Perhaps an easier way of putting the matter is this. Any snake found in the plains of Peninsula India (see map of distribution) which has 17 scale rows anteriorly and in midbody, and only 15 at a point two headlengths before the vent, together with only 4 or 5 infralabials will almost for certain prove to be *arnensis*. This remark, though will not apply to the hills for the following species combining the same characters, may be associated with *arnensis* in certain upland localities. In the Eastern Himalayas, including of course Nepal, *Oligodon erythrogaster* occurs, and in the South Indian Hills *Simotes beddomei*, *Oligodon venustus* *O. travancoricus*, and *O. affinis*. In these Hills, and their immediately adjacent low country recourse must be had to the method of identification first indicated.

*General characters*.—The body is cylindrical, rather short, smooth, and of even calibre throughout. A neck is slightly indicated behind the slightly expanded jaws. The head is moderately depressed, the snout short, rather blunt, and devoid of any canthus. The nostril is open, and evident, and the eye is of moderate size with round pupil, and an iris of ruddy or brownish gold. The tail is short, somewhat compressed basally, and accounts for about one-sixth to one-seventh the total length of the snake.

*Colouration*.—The ground colour is brown of various hues, inclined sometimes to a ruddy, or a purplish tint. It fades to a more or less degree in the flanks. The back is crossed with black bars which are narrowly, but usually distinctly, outlined with whitish or pale yellow. They do not reach the ventrals, but break up in the flanks into streaks. They vary somewhat in width, but are, I think,



always distinctly narrower than the intervals left between them. Their number seems to vary with the locality. In the United Provinces, Punjab, N. W. Frontier and the Western Himalayas my examples have shown from 41 to 54 on the body, and 9 to 12 on the tail. From Orissa I have had one with 37 bars on the body, and only 6 on the tail. Russell's Arni specimen had only 22 on the whole length and Günther mentions one from Ceylon with only 17 on the body. I have seen as many as 62 bars in a specimen from Behar. In the vast majority of specimens these bars are of even width in mid-dorsum and taper costally, but I have seen a specimen in Fyzabad, and another from Bannu in which they were indented in the median line anteriorly and posteriorly and converted into twin beads, or figures of eight. This form of mark is common in many of the species of *Simotes* and *Oligodon*. In the intervals between the bars the flanks are variegated with short streaks. The belly is usually of a uniform pearly white, but is often black spotted, or Mr. Boulenger says the ventrals may be bordered at their free edges with brown. The spotted specimens are, I find, not peculiar to any locality, for I have seen a specimen in Almora in which most ventrals had a spot at one or other side, and Mr. Boulenger records such from Nepal, and S. India, where the majority of specimens are unspotted. The head is adorned with three conspicuous black marks which are often, if not usually, bordered narrowly with white or pale yellow. The anterior mark is crescentic, and passes across in front of the eyes to re-appear below them. The median and posterior are sagittate, the apex of the former reaching to the frontal and the arms to behind the gape, whilst the apex of the latter passes to the parietals, and the arms to the sides of the neck. The posterior sagitta is much the broader one. These three marks are nearly always discrete, unlike the same marks in some other species which are connected by a median shaft. In very old specimens these head marks tend to disintegrate, and become obscured. There are usually some dark streaks to be seen in some of the supralabial sutures.

*Dimensions.*—Adults usually range between 18 and 21 inches, but I have had at least eight specimens exceeding these measurements, the two largest, both females, being exactly two feet long. Günther mentions one 25 inches long.

*Habits.*—Nearly all the specimens I have had came from within Cantonment limits. I have come across many alive on the roads, or the wayside, and have even met with it on the open parade ground more than once. More usually it does not stray from within easy touch of efficient cover. It appears to make its home for the most part in masonry, frequently domiciling itself in bungalows and out-houses. I have received many with the report that they were found in the house. Mr. Reid tells me that in Behar, where it is common, it frequents buildings and old walls. I once had one sent to me



that had fallen into a well in the compound, having probably fallen from the masonry. One received this year was found at night in the bedding of one of the Gurkhas encamped on granite hill, Almora. This like other kukri snakes is of course harmless, but a specimen in Bannu was responsible for the death of a sepoy. I am indebted to Captain Sumner, I.M.S., for the details of the incident. It appears that the sepoy with others was on duty at Kurram Garti (8 miles from Bannu) and under canvas. He came off sentry at about 11 p.m., removed his uniform, and laid down on his bed on the ground. He jumped up immediately rubbing his buttock, and declared that something had bitten him there. His companions searched his bedding, and there found a snake which they killed. They examined him, but could see no signs of a bite and tried to persuade him, though without success, that he had not been bitten. The next morning he did not get up, and his companions could not rouse him. The Hospital Assistant was sent for and found him comatose. He did what he could for him, and sent him in a dhooly to Bannu, but he expired on the way. Captain Sumner here examined the body, and could find no local signs of the bite, and was much perplexed as to the cause of death. The snake was put into a bottle, and kept in the hospital, and when I heard of the case I wrote to Lt.-Col. Magrath in Bannu, who sent me the specimen. To my surprise I found the author of the mischief was a common kukri snake, 1 foot  $7\frac{1}{2}$  inches long. It seems to me that the man must have died of fright, believing himself bitten.

*Disposition.*—I do not consider it a malicious snake, though it will sometimes menace, or even inflict a bite when molested, or its liberty is jeopardised. I have had many alive, picked up several in their natural haunts, and had more than one in captivity. Some showed great timidity, others faced round pluckily and menaced or struck without inflicting an injury, or more rarely actually bit me. Russell had one that he brought face to face with pigeons and chickens, but which he could not induce it to bite.

*Habits.*—It is an active and voracious little reptile, easily taking alarm, and hastily attempting concealment. It is often wonderfully adroit in evading swift movements directed towards seizing it by the neck, and has made me realise how cautious one should be in attempting the capture of poisonous snakes in this manner.

I have seen it inflate its body to a remarkable degree under the influence of excitement. It was noticed that the expansion affected a length of the body considerably in excess of the limits of the lug, for it was observed to reach to the 13th cross-bar. Subsequent dissection showed the lug ended at the 11th cross-bar. In addition to this inflating effort, some specimens may be observed



to flatten the posterior part of the head on to the ground by the action of the quadrates, and in so doing they make the neck much more apparent than normal. I have nearly always encountered it in motion in broad daylight, but some specimens I have had sent to me were killed in bungalows after nightfall. It climbs with facility as do most snakes that have their ventrals angulate, this condition approximating to that of the true keeled condition seen in the tree snakes *Dendrophis* and *Chrysopelea*. Two were discovered in Fyzabad, evidently a pair, in the act of scaling a mud wall, another fell off the top of a doorway in Berhampur on to a lady when opening a godown. The situation, some six feet from the floor, was a remarkable one for any snake, and an inspection of the place gave no clue to its probable path of ascent. It is more frequently met with in the rains than at other times during the year.

*Food.*—I have but rarely found anything in the stomach. A specimen killed in Almora contained two sausage-shaped gristly masses of a yellow colour, the nature of which I could not ascertain as the material appeared to have no structure. With these was the flaccid envelope of a snake's or lizard's egg, which had been extensively perforated at both poles. On another occasion I found a plug of hair in the cloaca of considerable proportions. This taken with the choice of an abode about habitations leads me to think that it preys chiefly upon mice.

*The Sexes.*—In Fyzabad out of 15 sexed, 8 proved to be ♂ and 7 ♀. In Almora of 12 sexed, 9 were ♂ and only 3 ♀. The female has a relatively longer body, and shorter tail as might be inferred from the difference in the ventrals and subcaudals in the sexes. There appears to be little, if any, difference in the growth of the sexes, for although my two largest records of two feet were both females, I have had males 1 foot 10 $\frac{3}{4}$  inches and 1 foot 11 $\frac{3}{4}$  inches.

*Breeding.*—The mating season in the plains is during the rains. I have on two occasions—both in Fyzabad—acquired gravid females, but both unfortunately were killed. One contained 5 eggs of very considerable dimensions, the largest measuring 1 $\frac{8}{10}$  ×  $\frac{7}{10}$  inches. There was no trace of an embryo within. My second gravid specimen obtained like the first in August had 4 impregnated ovarian follicles enlarged to  $\frac{1}{2}$  of an inch. In the latter case a ♂ was killed at the same time, both snakes being discovered within a couple of yards of one another scaling the same wall. This adds another instance to many already mentioned in these papers, to show that the matrimonial bond does not abruptly cease after sexual gratification. The smaller gravid ♀ measured 1 foot 9 $\frac{1}{4}$  inches, a length which I estimate would be attained by the end of the fourth year of life. It is not known for certain whether this species is



oviparous though this is probably the case. My youngest specimens which I took to be hatchlings measured  $6\frac{1}{2}$  and  $6\frac{5}{8}$  inches in April,  $7\frac{1}{2}$  and  $7\frac{3}{4}$  inches in May and  $7\frac{1}{4}$  and  $7\frac{3}{4}$  inches in July. It is probable, therefore, that the breeding season embraces three or four months of the year.

*Growth*.—From my records of length it appears that the young grow some 4 to 5 inches in their first year, and 3 to 4 inches in the second, third and fourth years of life.

*Distribution*.—Peninsular India and Ceylon. In India it extends north to the Himalayas and East and West to the outside limits of the territory drained by the Ganges and Indus Rivers. To the North-East it appears to be limited by the Teesta River, at any rate I can find no record East of this river excepting the Sikkim one to which I will refer again.\* To the North-West it ranges to the Frontier, but there is no record of its occurrence in the Indus system further South, viz., in Rajputana and Sind, and it is quite likely that it does not extend into these Provinces.

It is for the most part a snake of the plains, but is common in Almora at 5,400 feet, so that one may suppose it occurs in other hills up to about 6,000 feet. I have had it from the Himalayas as far West as Bakloh (4,500 feet). There are specimens from Nepal in the British Museum, with no altitude specified, but I discredit the locality of the specimen in the same institution said to be from Sikkim.† Nicholson mentions it from Bangalore (circa 3,000 feet) in Southern India, and there are examples in the British Museum from the Anamallays, altitude not specified.

I found it a common snake in the United Provinces. Mr. Reid tells me it is common in Behar, and Mr. Muir says it is fairly common in Bengal (Kahna). Jerdon reports it rather common in Southern India, and Haly in the low country in Ceylon. In the last locality it does not appear to have been collected at a greater altitude than Kandy (circa 1,600 feet).

The precise localities known to me are set forth in the accompanying map.

*Lepidosis*.—*Rostral*.—Touches 6 shields, the rostro-internasal sutures being equal to, or rather longer than, the rostro-nasal; the portion visible above equal to or little less than its distance to the

\* Mr. W. A. Jacob, I.F.S., has collected assiduously in the Jalpaiguri District, East of Teesta, for some years and has given me a list of 29 species he has found there. This does not include *arnensis*. The fauna of this District agrees with that of Assam as remarked upon by me in a previous paper in this Journal (Vol. XIX. p. 897).

† As already stated I can find no record other than this one from East of Teesta; and here, I may remark, that I have examined at least 1,200 snakes from various altitudes in Sikkim, but never seen *arnensis*. It is a very significant fact too that Messrs. Von Schlagintweit from whom this record emanates are also responsible for the records of *Eryx conicus*, and *E. johnei* from Sikkim, both of which are discredited by Mr. Boulenger (*vide* Catalogue, Vol. I, pp. 124 and 128).



frontal. *Internasals*.—A pair, the suture between them equal to, or rather less than that between the præfrontal fellows, less than half the internaso-præfrontal sutures. *Præfrontals*.—A pair, the suture between them less than (about half) the præfronto-frontal sutures, touching the internasal, postnasal, loreal, præocular and supraocular.

*Frontal*.—Touches 6 shields, the sutures subequal, or supraoculars rather longest. *Supraoculars*.—Length less than the frontal, breadth about half the frontal opposite the middle of the eyes. *Loreal*.—Single, very small, about half the length of the nasals, rarely absent. *Præocular*.—One, not reaching the top of the head. *Postoculars*.—Two. *Temporal*.—One. *Supralabials*.—7, the 3rd and 4th touching the eye. *Infralabials*.—5, the 5th largest, and in contact with two scales behind; 4th and 5th touching the posterior sublinguals. *Sublinguals*.—Two pairs; the anterior rather larger. *Costals*.—Two headlengths behind the head 17, midbody 17, two headlengths before the vent 15. The reduction of rows is caused by a disappearance of the 4th above the ventrals, which is usually absorbed into the 3rd (more rarely the 5th). Apical pits and keels absent.

*Ventrals*.—These vary with the sex. In the ♂ 170 to 186, in the ♀ 180 to 199; somewhat angulate laterally. *Anal*.—Divided. *Subcaudals*.—Divided, varying in number with sex. In the ♂ 48 to 59, in the ♀ 41 to 50.

*Anomalies*.—Sometimes a fragment is detached from the parietal to form a pseudo-temporal. The loreal is rarely absent. In one instance where I found it so the præfrontal touched the 2nd and 3rd supralabials. It is not very unusual to find the 6th supralabial failing to come to the labial margin, but wedged between the 5th and 7th shields (see figure B (a) of our Diagram). I have once seen the 6th and 7th supralabials completely confluent. Only 4 infralabials occur somewhat commonly. I have seen one specimen with the anal entire, and another in which the 4th, 6th and 7th subcaudals were entire.

*Dentition*.\*—The *maxilla* supports from 8 to 11 teeth markedly syncranterian in type, the posterior especially being highly compressed and bladelike. There is an edentulous space in front that would accommodate 3 or 4 teeth. The *palatine* has an edentulous space anteriorly, that might take two teeth, and a much longer space posteriorly. In the middle there are from 3 to 6 teeth. The *pterygoid* has an edentulous space in front behind which are from 6 to 18 teeth (6 to 11 in Almora specimens, and 15 to 18 in a Fyzabad example). The *mandibular* array number 13 to 14, which are small and subequal.

Our plate is good. Many specimens, however, show the bars even more clearly outlined with yellow, and it is not usual for the bars to pass as low in the flanks before disintegrating. The first head

\* Taken from 3 skulls in my collection.



mark is not usually so sagittate as represented. Figure 1 (b) shows the somewhat unusual ventral maculation.

### *SIMOTES ALBOCINCTUS* (CANTOR.)

#### THE LADDER BACK OR LIGHT-BARRED KUKRI SNAKE.

*History*.—Dr. Cantor is responsible for our first introduction to this snake, which he described in the year 1839. It has been confused with several others of the same genus by past authors, partly on account of the great similarity in lepidosis shown by many of the allied forms, and partly owing to the great variability in the colour and markings of many individuals of what are still held to be but one species. Blyth in 1854 remarked on the variability of this species, but as he refers to specimens from Southern India and Ceylon, we may presume that *arnensis* was at least one of the forms to which he alluded. Even, as late as 1894, Mr. Boulenger recognised these varieties in his Catalogue. One of these, viz., Var C., I think, I have shown in (Vol. XX of this Journal, p. 162), is entitled to rank as a distinct species which I have named *juglandifer*. Besides the very distinctive dorsal marks shaped like walnut kernels, or the quadruple spots placed crosswise and the complete absence of light bars, such as are seen in *alboincinctus* it shows a short edentulous space in front of the palatine, that does not occur in *alboincinctus*.

*Nomenclature*.—(a) *Scientific*.—The specific name is derived from the Latin “*albus*,” white, and “*cinctus*,” a belt, but is not altogether satisfactory, as the marks referred to are dorsal bars and not belts.

*English*.—The regularity of the bars on the back, and their wonderful uniformity in spacing remind one of a ladder and suggested the name “ladder back,” but perhaps the “light-barred kukri snake” may appeal more to some.

*Vernacular*.—The only name I am acquainted with is “sar-vul-saw” which Captain Venning (Vol. XX, p. 335 of this Journal) tells us is applied by the natives in the Chin Hills, Upper Burma, to this as well as to the snakes *Coluber porphyraceus*, and *Callophis maclellandi*, all by the way reddish snakes.

*Identification*.—Attention must be directed to the sutures between the internasal and præfrontal fellows, to which I have already referred in discussing the identification of *arnensis*. The following combination of characters will separate the “ladder back” from other kukri snakes except *juglandifer* :—(1) Costals 19 in midbody, (2) anal entire, (3) a single temporal. The bars across the back of *alboincinctus* are very distinctive, and no trace of them is to be seen in *juglandifer*.

*General characters*.—The body is cylindrical, smooth, stout, and



rather short, and the skin as in other kukri snakes is not nearly so loose as in most colubrids and vipers. The belly is angulated at the sides. The head is short and broad, and the snout subtruncate. There is no indication of a canthus, and the head even at the back is barely broader than the neck. The nostril is open, and placed between two shields. The eye is of moderate size with round pupil and a yellow iris. The tongue is reddish at the base and black at the tips. The tail is compressed at the base and short, accounting for about one-fifth to one-sixth the total length.

*Colouration.*—Though Blyth has remarked on the variability of the snake, and other writers have recognised three, and even four varieties, my experience—I have examined over fifty specimens—shows that it is variable in its general colouration, but wonderfully constant, and distinctive in its markings. The ground colour is brown of various tones, but often more or less strongly tinged with purplish or red. In some the hue is much the same as in a cigar, in others it is like raw beef, and in others again berry-red, and even lobster-red. In the ruddy specimens the underlying hue is usually a lobster-red, which on close inspection will be seen at the bases and edges of the scales. A suffusion of brown on the rest of the scale tones down the general colour, which is always however most vivid in the flanks. Rarely there is no suffusion of darker tones, and the specimen is uniform lobster or salmon-red.

The back is crossed by bars which differ from those seen in *arnensis*, in being light centrally, and heavily bordered with black. These bars which number from 17 to 25 on the body and 4 to 8 on the tail are seen at wonderfully regular intervals in the whole length of the snake, and they involve two or three scales in the body length, the intervals involving from five to eight. Each bar is of uniform width, and extends well into the flanks, its central zone blending with the light underparts. The light central zone may be whitish, greyish-white, grey, or pale yellow, the last hue being often seen in the berry-red examples. In some specimens some rather obscure longitudinal striping may be observed just as one sees in *S. cyclurus*, and some of the other species. When present this consists of a dark band about five scales broad which passes down the middle of the back, and a narrower similar band on the 3rd and 4th scale rows above the ventrals.

The head is pale greyish or yellowish and bears the usual three marks which are so characteristic of the kukri snakes. In the lobster-coloured specimens the marks are white. There is a great tendency for some or all of these marks to be disintegrated and more or less confluent, as will be seen in figure 2 (a) of our Plate, where the median sagitta is much broken up, and its isolated central macula is confluent with the apex of the nuchal sagitta. In many



specimens one sees a light black-edged stripe on the nape, the edges of which may be parallel as in our Plate, or more or less U shaped. The belly is pearly-white, or in the ruddy specimens more or less mottled with pinkish, and is always spotted or mottled with dark tones. Usually there are squarish spots just within the angulation of the ventrals, and arranged with a tendency to miss each alternate or third shield. These spots may be discrete, and distant, or united by a band passing across each ventral, as seen in figure 2 of our Plate.

A solitary specimen collected by Theobald in the Arakan Hills was made the type of a distinct species (*amabilis*) by Günther. It is, however, considered by Mr. Boulenger only a variety of *albocinctus*, differing only in having more numerous bars, viz., 55, with correspondingly shorter intervals, involving from 3 to 4 scales.

*Dimensions.*—The average length of an adult is about two to two-and-a-half feet. My largest example taped exactly three feet.

*Haunts, Habits, etc.*—I have seen very few specimens in life, nearly all having been spirit specimens. As nearly all of these came from Tea Estates in Assam, or in the vicinity of Darjeeling, I may safely infer that this kukri snake is commonly to be met with in the daytime among the tea bushes during plucking operations. Two specimens at least were killed actually inside a bungalow in Dibrugarh. I know nothing of its disposition.

*Food.*—I found a mass of soil in the stomach of one, mixed with grits, shreds of vegetable fibre and two longish hairs, which I can only suppose were swallowed during its death throes, the scene being perhaps a stable floor. On the other few occasions, where I have found the stomach full, a mouse had furnished the repast. In one case the tail only was discovered, and the quarry must have made its escape.

*The Sexes.*—In the neighbourhood of Darjeeling the ♂ appears to be much more abundant than the ♀, I having had no less than 23 of the former to 14 of the latter sex. The tail is longer in the ♂, as may be inferred from the numbers of subcaudals, viz., 61 to 68, compared with from 42 to 57 in the ♀. There is also some slight difference in the relative lengths of the body in the sexes, but this is not so obvious from the ranges of the ventrals, which number from 181 to 199 (177, Boulenger) in the ♂, and from 182 to 206 in the ♀.

*Breeding.*—My only note bearing on this subject is to the effect that a ♀ killed on the 10th of July in Dibrugarh was found with three impregnated ovarian follicles measuring from  $\frac{3}{8}$  to  $\frac{5}{8}$  of an inch. The specimen measured 2 feet  $5\frac{1}{4}$  inches, but the tail was imperfect, and accounted for only 4 inches of that length.

*Distribution.*—The light-barred kukri snake has a more restricted range of distribution than most of the snakes dealt with in



these papers, but is so common within that area that it deserves mention in the series. It inhabits the Assam Hills and plains ranging North into the Eastern Himalayas, and East to the continuous ranges bounding the North and West of Burma, *i.e.*, the Kachin Hills, Manipur Hills, Chin Hills and Arakan Yomas. Its probable Western limits are the Teesta and Brahmaputra Rivers. The exact localities known to me are given in the accompanying map, but I have not been able to include the many places referred to in Selater's list of the snakes in the Indian Museum, as it is impossible to tell from this list what are specimens of true *albocinctus* and what may be *juglandifer*.

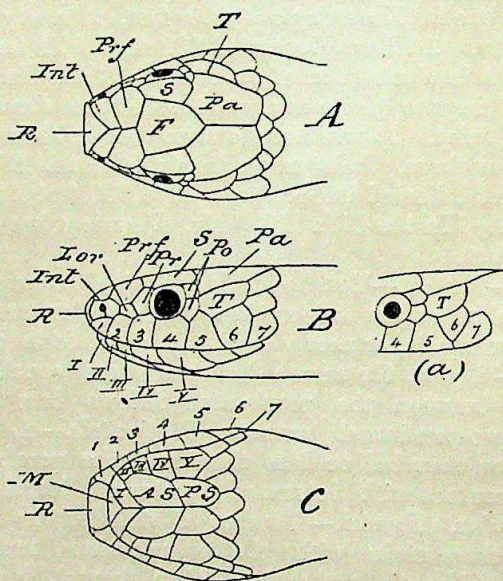
It appears to be a Hill snake, at any rate it is much commoner in most of the Hills within its habitat than it is in any part of the plains. In the Eastern Himalayas it is a very common snake between the plains and 5,000 feet elevation, but, although Mr. D'Abreu got one in Kurseong at 6,000 feet, it rarely ascends to this altitude. At Buxa Dooars (1,200 to 1,500 feet) I found four specimens in a collection of twenty-two. Mr. Jacob has collected several in the plains at about the 350 feet elevation in the Jalpaiguri District. It was not a common snake about Dibrugarh but I got a few there. It is known from the Khasi Hills, but out of 335 snakes collected in Shillong at 4,900 feet I failed to get one specimen. In the Chin Hills Mr. Venning has met with it up to 6,500 feet.

*Lepidosis*.—*Rostral*.—Touches 6 shields, the internasal sutures are equal to or rather longer than the anterior nasals; visible portion above equals, or nearly equals its distance to the frontal. *Internasals*.—A pair, the suture between them equals or nearly equals that between the prefrontal fellows less than half the internaso-prefrontal suture. *Praefrontals*.—A pair, the suture between them half or less than half the prefronto-frontal suture; in contact with internasal, postnasal, loreal, preocular and supraocular. *Frontal*.—Touches 6 shields, the sutures are subequal, or those made with the supraoculars, rather largest. *Supraoculars*.—Length rather less than frontal, breadth half or less than half the frontal opposite the centres of the eyes. *Nasals*.—Quite divided, in contact with the 1st and 2nd supralabials. *Loreal*.—One. *Praocular*.—One. *Postoculars*.—Two. *Temporal*.—One. *Supralabials*.—7, the 3rd and 4th touching the eye. *Infralabials*.—5, the 4th and 5th touching the posterior sublinguals, 5th largest, and in contact with two scales behind. *Sublingual*.—Two pairs, the anterior rather the larger. *Costals*.—Two headlengths behind the head 19, midbody 19, two headlengths before the vent 15 (rarely 17); no apical pits; no keels. *Ventrals*.—Angulate laterally; 77 to 199 in the ♂, 182 to 206 in the ♀. *Anal*.—Entire. *Subcaudals*.—Divided, 61 to 68 in the ♂, 42 to 57 in the ♀. *Anomalies*.—The



commonest abnormality is to find 8 supralabials, the 4th and 5th touching the eye. I have seen the præocular divided once, also the 2nd supralabial divided once. In Evans's specimen the loreal and præfrontals were confluent. The costal rows reduce sometimes only to 17 posteriorly. I have seen the 3rd and 4th subcaudals entire in two examples.

*Dentition.*—The *maxilla* has 10 or 11 teeth rapidly increasing in length from before backwards. The *palatine* supports 8 to 10 subequal teeth (7 on one side in one specimen), and there is no edentulous space anteriorly.\* The *pteryoid* teeth number from 16 to 19, and are subequal, and much smaller than the palatine. The *mandible* bears from 13 to 16 subequal teeth. Our Plate is good in every way, but perhaps it was a pity that a specimen for painting was selected that exhibited abnormal supralabials.



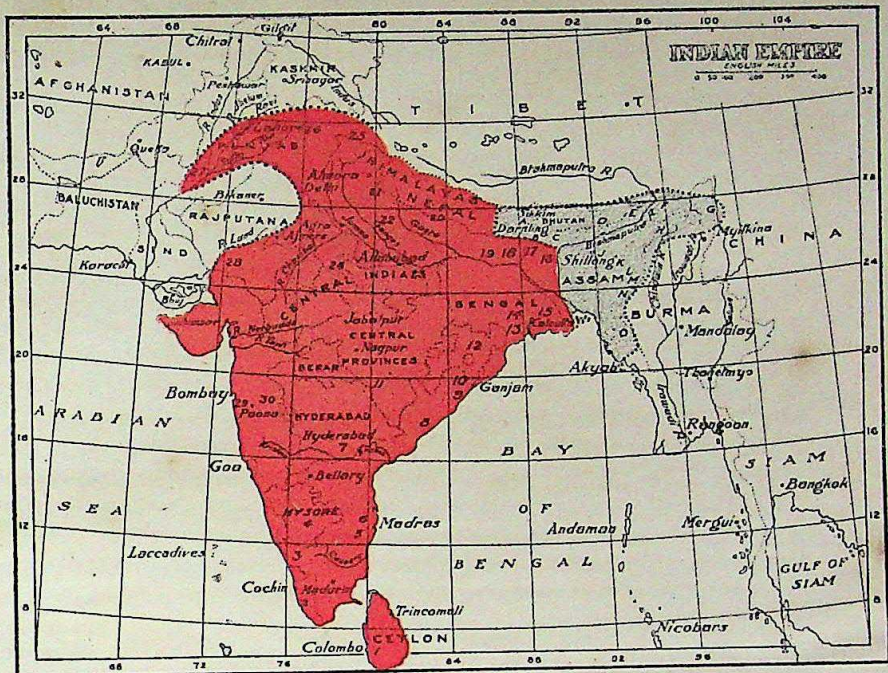
*Simotes arnensis.*

( $\times 1\frac{1}{2}$ )

\* In this respect it differs from *juglandifer* where a space is seen anteriorly that would take one tooth. The teeth in 3 skulls of *juglandifer* number 7 (6 on one side in one specimen).



Map to show distribution of *Simotes arnensis* in red, *Simotes albocinctus* in grey.



..... lines shown thus, imply boundary doubtful

#### LOCALITIES IN MAP SHOWING BY FIGURES DISTRIBUTION OF *SIMOTES ARNENSIS*.

(1) Ceylon (Haly and B. M.), (2) Travancore (Bo. M. and Ferguson), (3) Anamallays (B. M.), (4) Bangalore (Nicholson), (5) Arni (Russell), (6) Madras (B. M.), (7) Hyderabad (Bo. M.), (8) Vizagapatam (Bo. M.), (9) Aska (I. M.), (10) Berhampur (F. W.), (11) Chanda (Bo. M.), (12) Singbhum, (I. M.), (13) Kalna (F. W.), (14) Serampur and Bankura (I. M.), (15) Calcutta (I. M.), (16) Kaliganj (I. M.), (17) Purneah (I. M.), (18) Champaran (F. W.), (19) Muzzaffarpur (I. M.), (20) Nepal (B. M.), (21) Almora (F. W.), (22) Fyzabad (F. W.), (23) Allahabad (I. M.), (24) Nowgong (I. M.), (25) Bakloh (F. W.), (26) Lahore (F. W.), (27) Bannu (F. W.), (28) Deesa (B. M.), (29) Bombay, Bassein, Kalyan, Karwar (Bo. M.) and (30) Poona (B. M.)

B. M., implies British Museum, I. M., the Indian Museum, Bo. M., our Society's collection, F. W., the author.

#### LOCALITIES IN MAP SHOWING BY LETTERS DISTRIBUTION OF *SIMOTES ALBOCINCTUS*.

(A) Darjeeling and vicinity (F. W.), (B) Buxa Dooars (F. W.), (C) Jalpaiguri (F. W.), (D) N. Lakhimpur (F. W.), (E) Dibrugarh (F. W.), (F) Sadia (F. W.), (G) Sadon, Kachin Hills (Evans), (H) Jaipur (F. W.), (J) Khasi Hills (B. M.), (K) Cherrapunji (Gunter), (L) Haflong, N. Cachar Hills (F. W.), (M) Manipur (F. W.), (N) Chin Hills (Venning), (O) Arakan Hills (B. M.).

B. M. implies British Museum, F. W. the author.







## NOTES ON INDIAN BUTTERFLIES—(continued).

By

CAPTAIN W. H. EVANS, R.E.

8. Occurrence of *Mycalesis* (*Mydosama*) *fuscum*. Fd. at Myitta, Tavoy. Mr. O. C. Ollenbach has recently sent me a specimen of this insect caught in March 1912. A description is given of the species in a footnote on page 132 of De Nicville's "Butterflies of India," vol. 1. *Fuscum* was placed by Moore in his genus *Mydosama*, which is closely allied to *Nissanga*, containing the Indian *Junonia*, etc. Fruhstorfer places it in his Group III along with *perseus*, *malsara*, *mestra*, etc., all of which have similar male secondary sexual characters. The butterfly was described from the Malay Peninsula and has since been found in Java, Sumatra, Borneo, Banka and Nias. Mr. Ollenbach's specimen is a female; above it is rather pale-brown, darker basally; the lower median ocellus on the forewing and all the ocelli on the hindwing show through prominently and are surrounded by bright fulvous rings, though obscurely so on the forewing. Below the ground colour is pale yellow-brown with a slight fulvous tinge; across both wings there is a prominent narrow bright ferruginous sub-basal band followed by a similar postdiscal band, also the ends of the cells are obscurely outlined in the same way: the postdiscal band on the forewing is curved outwards at the lower end near the dorsum, on the hindwing it follows the curve of the ocelli to which it is adjacent. Beyond the postdiscal bands the outer area is paler; there are two small apical and one large median ocellus on the forewing, whilst on the hindwing there are seven ocelli of exactly equal size, except for the anal pair, which are smaller. The outer marginal lines are sharply defined and similar in arrangement to that prevailing in all representatives of the genus. In size and shape the insect resembles a female of *mineus* or *malsara*.

9. Changes and corrections in the list of Indian butterflies. Since the list was published (J. B. N. H. S. XXI, 982), Swinhoe has progressed rapidly with *Lepidoptera Indica* and the work is now nearly completed; Fruhstorfer has nearly reached the end of the *Nymphalidæ*; and there are a few mistakes in the original list, which require correction. I give Fruhstorfer's races for what they are worth; the validity of some of them seem doubtful, but I have not sufficient material in my own collection to give an opinion.

(1) *Hestia jasonia*, Wd. Fruhstorfer names ab *diabolica* a form with the underside suffused dark-brown. He suggests that *jasonia* is a race of the Malayan *lynceus*, Drury.

(2) *Danais melaneus*, Cr. Fruhstorfer names the dry season form *neopatra*.

(3) *Danais plexippus*, L. Fruhstorfer calls a light yellow dry season form from Sikkim and Annam *grynon*.

(4) *Euplœa harrisi*, Fd. Fruhstorfer names ab *discaelis* from Assam, with a blue cell spot and 5 discal spots on the forewing and two normal rows of white spots on the hindwing.

(5) *Euplœa klugii*, M. In the appendix to the *Danainæ* Fruhstorfer places *leucostictos*, Gmelin, and its races as races of *klugii*.

(6) *Euplœa diocletiana*, Fab. Fruhstorfer gives the name *despoliata* to specimens with no transcellular spots.

(7) *Melanargia halimede*, Men. Fruhstorfer gives the name of the genus as *Arge*, Hub. on the ground of priority. From Bingham's figure he considers that the Indian form is nearest to the race *montana*, Leech, but in size it is nearer *leda*, Leech.



- (8) **Orinoma damaris**, Grey. Fruhstorfer names race *harmostus* from Tandong, Tenasserim; smaller spots lighter, yellow cell spot larger.
- (9) **Aulocera swaha**, Koil. Fruhstorfer divides this into three races; *swaha* from Kashmir with a narrow light yellow band above, this band being white below; *garuna*, Fruh. from Kulu with a wider band, always yellowish, especially below; *tellula*, Fruh. from Mardan, N. W. F. Province, intermediate between the other two, but above the band on both wings is uniform straw colour, whilst in the other forms the darker yellow of the forewing contrasts with the much paler colour of the band on the hindwing. My own experience of *A. swaha* is that the form that flies in Chitral agrees closely with that found in Simla; in the interior of Kulu, etc., however, there flies a form with a much darker yellow band above which may perhaps be called *garuna*. Fruhstorfer appears to have received many butterflies from Mardan, "collected by officers of the garrison"; as many of these have only been found by other people at much higher elevations, there would seem to be some mistake about the locality.
- (10) **Epinephele cheena**, M. The Western race, *kashmirica*, M., from Chitral and Kashmir deserves to be separated; it is much smaller and duller, the underside is paler and the discal band on the forewing is straighter and less prominent.
- (11) **Erites argentina**, But. I gave the Indian race as *ines*, Fruh. Its occurrence in Indian limits is very doubtful, though Moore stated that he had received a specimen from Adamson. It should be removed from the Indian list, as there appears to be no other record of its capture nearer to India than Singapore.
- (12) **Lethe confusa**, Aur. The name of the Eastern race should be *gambara*, Fruh., not *gambara*.
- (13) **Lethe minerva**, Fab. The typical form flies in Java; all Indian specimens belong to the race *tritogeneia*, Fruh. (not *tritogenia*).
- (14) **Lethe mekara**, M. Fruhstorfer names the spring form *vajra*. He describes the Tonkin race as *crijnana*, stating that it probably occurs in Tenasserim; it differs from the typical form in lacking the discal silver bordering of the very narrow dark-brown median areas of both wings, thus forming a link to the Macromalayan races.
- (15) **Lethe gulnihai**, DeN. Fruhstorfer separates pale specimens from Saipha, Upper Burma, as *issa*.
- (16) **Lethe sidonis**, Mar. Dry season form *gelduba*, Fruh.
- (17) **Lethe baladeva**, M. The name of the Kumaon race should be *aisa*, Fruh. not *asia*.
- (18) **Ypthima newara**, M. The name of the Eastern race is *sarcaposa*, Fruh., not *sarcoposa*.
- (19) **Melanitis phedima bela**, M. The small pale form from the Western Himalayas deserves to be separated = *phedima galkissa*, Fruh.
- (20) **Melanitis zitenius**, Herbst. Fruhstorfer names ab *decolarata*, a dry season form with no yellow band.
- (21) **Elymnias hypermnestra undularis**, Drury. Fruhstorfer names female ab *paraleuca*, with a white hindwing.
- (22) **Elymnias malelus**, Hew. Fruhstorfer names female ab *subdecorata*, with a white submarginal band.
- (23) **Clerome**, Wd. Fruhstorfer changes the name to *Faunis*, Hub., and includes in this genus *Melanocyma*, Wd. *Faunis* certainly ought to be adopted on the score of priority; *Melanocyma* might be retained as a subgenus.
- (24) **Zeuxidia doubledayi**, Wd. The typical form was described from Borneo; the continental race is named *chersonesia*, Fruh.



(25) *Amathusia phidippus*, Joh. The type was described from Java; Fruhstorfer names the continental Indian race *friderici*.

(26) *Discophora celinde continentalis*, Stdg. Fruhstorfer states that *celinde*, Stoll, is a Javan insect, specifically distinct from the Indian *continentalis*. The latter was described from Sikkim and the Tonkin race is *seminecho*, Stich, which Fruhstorfer thinks is probably the form occurring from Upper Burma to Tenasserim. *Celinde* has no small yellow scent patch in a bare space on the internal nervure of the hindwing, which is always present in *continentalis*. *Seminecho* differs from *continentalis* in having a curved series of crescentic spots, dull yellow, running from the costal spot beyond the cell as a submarginal band.

(27) *Discophora tullia*, Cr., was described from South China. Fruhstorfer states that the oldest name for the North Indian form is *zal*, Wd., the wet season form being *indica*, Stdg. Specimens with no blue spots on the forewing above are *despoliata*, Stich. Stichel has named the South Indian race *muscina*; it was discovered at Karwar, North Kanara, by Davidson, Bell and Aitken (J. A. S. B. 1900). Fruhstorfer gives a complete description of *muscina*, but does not say how it differs from *continentalis* from North India.

(28) *Discophora lepida*, M. Stichel has named the wet season form *significans*. Fruhstorfer separates the Ceylon race as *ceylonica*: the main difference is that in the females the subapical pale band on the forewing above is broken into spots.

(29) *Cyrestis thyodamas*, Bdl. The yellow variety flying in the Himalayas with the typical form is *ganescha*, Koll.; it may occur in either sex but more commonly in the female.

(30) *Cyrestis periander*, Fab. The typical form is confined to Siam, and all Indian specimens belong to the larger race *binghami*, Martin; the difference, however, is trifling.

(31) *Cyrestis cocles*, Fab. This species occurs in three forms; *cocles* was described from Siam and is an intermediate form, outwardly dark; *natta*, Swin., described from Assam, is the darkest form with sepia bases; the pale form was described as *earli* by Distant from the Malay Peninsula; the three forms are connected by intermediates. Andaman specimens only differ in being larger; an intermediate form between *earli* and *cocles* was described by Felder as *formosa*: the pale form is *andamanica*, Wm. and DeN.; the dark form does not seem to occur. In Assam the *cocles* and *earli* forms appear to fly together in the autumn, while the *natta* form occurs by itself in the earlier months of the year, April and May.

(32) *Cyrestis risa*, Db. Martin has named the larger, darker spring form *transiens*.

(33) *Junonia iphita*, Cr. Fruhstorfer separates the race from South India, Ceylon and the Maldive Islands as *pluvialis*, stating that it is darker and lacks the paler margin of the typical form.

(34) *Junonia lemonias*, L. It is rather difficult to follow Fruhstorfer's treatment of this species. *Lemonias* is the wet season and *aonis*, Cr., the dry season form from the Himalayas to Burma. *Persicaria*, Fruh., is said to be a small form occurring at all seasons and in Fruhstorfer's collection from Cashmere, Ceylon and Siam; *vaisya*, Fruh., is a form said to occur in Bombay and Luzon. From the letterpress it is not clear how the last two forms are defined or whether they are races or varieties; *persicaria* may be a variety with a peach coloured underside and *vaisya* the small form.

(35) *Junonia orithyia*, L. Fruhstorfer confines *orithyia*, the large race, with the blue apical spot on the forewing small, to China, and calls the race flying from Sikkim to Tenasserim *ocyale*, Hub., the wet season of which he names *phycites*. He separates off two further races from the



Indian region, viz., *swinhoei*, But., from Baluchistan to the N. W. Himalayas, always with a stone-coloured underside and *patenas*, Fruh., from Ceylon, with a much dwarfed wet season form. He does not say what we are to call the South and Central Indian form. He also states that in Baluchistan *swinhoei* gradually merges into *ocycle*; this is strange; as from his statement of the distribution of the two races their meeting place should be somewhere between Kumaon and Sikkim.

(36) *Vanessa indica*, **Herbst**. The Ceylon race is *nubicola*, Fruh., which differs from *indica* in that the outer margin of the hindwing is comparatively much more broadly black. South Indian specimens are intermediate and are called *pholoe* by Fruhstorfer.

(37) *Vanessa antiopa*, **L.** Indian specimens are stated to agree best with the race from Siao Lou, *yeddanula*, Fruh., as the yellow border is dusted with black.

(38) *Vanessa cashmirensis*, **Koll.** This is the Kashmir form; Fruhstorfer separates the race flying from Simla to Sikkim as *esis*, differing in having the yellow submarginal zone above shaded with black.

(39) *Vanessa v-album*, **Fab.** Fruhstorfer says that this should be called *l-album*, **Esp.**

(40) *Yoma sabina vasuki*, **Doh.** The typical form has broad white bands below; specimens with black fungiform spots on these bands are *atomaria*, Fruh., those with no bands are *sabulosa*, Fruh., small, rich yellow specimens with yellow, not grey, undersides are *javana*, Fruh.

(41) *Hypolimnas bolina*, **L.** Wet season males are *bolina-liria*, **Fab.**; specimens with two rows of marginal white dots are *ornamentalis*, Fruh. Dry season males with no white are *charybdis*, **But.**; specimens lacking the light border and median area below are *luctuosa*, Fruh.; if the striation on the underside is irrorated with violet, we have *subviolacea*, Fruh. *Jacintha*, **Drury**, are females with no blue on the forewing and broad cream borders on the hindwing; *avia*, **Fab.**, are females with a blue suffused forewing; *egna*, Fruh., are small females of the dry season form with a double anteterninal row of white spots and a narrow pale violet to dark-blue transverse band.

(42) *Kallima inachus*, **Bdl.** The Western Himalyan race is *huegeli*, **Koll.**, described from an extreme dry season form from Kashmir; *boisduvali*, **M.**, is the wet season form and *buckelyi*, **M.**, an intermediate form, both from Kashmir; *huttoni*, **M.**, and *atkinsoni*, **M.**, are wet season forms from Mussoorie. As *inachus*, Fruhstorfer designates the race that flies from Nepal to Tonkin, *inachus* itself being a dry season form; *ramsayi*, **M.**, is the wet season form described from Nepal. As varieties based on the undersides he names *foliacea*, all pale-grey; *siccifolia*, with black midrib and veins; *marmorata* yellow clouded red-brown and *uredinophora*, with black fungiform spots. *Limborgi*, **M.**, he treats as a distinct species, much darker and with the outline of the wing very rounded; its distribution is from Upper Burma to South Tenasserim. The predominating underside variety of *limborgi* is "beautiful red-brown," *acerifolia*, Fruh.; *foliacea* and *uredinophora* also occur. He states that all the underside varieties occur in the South Indian *horsfieldii*, **Koll.**, except *marmorata*; in the Ceylon race *philarchus*, **Wd.**, *foliacea* and *uredinophora* predominate, while *acerifolia* occurs rarely.

(43) *Kallima alompra*, **M.** Fruhstorfer separates this as a species with *kenyveti*, **Den.**, as a race.

(44) *Terinos clarissa*, **Bdl.** This was described from Java and the Indian race is *malayana*, Fruh.

(45) *Cynthia erota*, **Fab.** The dry season form is *pura*, **Swin.** = *circe*, **Fawcett**. A variety of the female just like the male is named *auricoma*,



Fruh. A variety of the wet season form with an extra eye spot on the hindwing is *triocellata*, Fruh.

(46) *Cirrochroa bajadeta*, M. Fruhstofer states that the oldest name for this species is *emalea*, God., and that the Indian race should be so named; the dry season form is *martini*, Fruh. *Bajadeta*=*ravana*, M., is the Javan race of *emalea*.

(47) *Cirrochroa mithila*, M. This is placed as a race of *tyche*, Fd., from the Philippines.

(48) *Cirrochroa aoris*, Db. *Jiraria*, Swin., is the dry season form. *Stramentica*, Fruh., is a wet season form with a straw coloured zigzag band on the underside.

(49) *Argynnis maia*, Cr. The Indian form probably belongs to the eastern race *pasargades*, Fruh.

(50) *Argynnis aglaia*, L. Fruhstorfer names the dark race occurring at low elevations in Chitral *yopala*. I have already given this form the name *ashretha*, (J. B. N. H. S. XXI, 1982); the description of *ashretha* was published on March 31st, 1912, and of *yopala* on April 11th, 1912, so the name *ashretha* will stand.

(51) *Argynnis adippe*, L. Fruhstorfer describes a new race, *mohmandorum*, from the border between Afghanistan and the North-West Frontier Province; it is said to be larger and darker.

(52) *Argynnis pales*, W. V. The small pale form from Kashmir and Kulu is *sipora*, M.; of *baralacha*, M., Fruhstofer merely says "separated by Seitz." The large form from Afghanistan and Ladak usually called *generator*, Stdg., is said to be nearer to *korta*, Fruh. On account of its variegated underside Fruhstorfer separates the Sikkim race as *eupales*. From the specimens in my own collection I certainly think that the Sikkim race is worth a name.

(53) *Melitæa didyma*, Esp. Fruhstorfer gives as races *chitralensis*, M. from Chitral; *robertsi*, But., from Afghanistan; *persea*, Koll., from Rawalpindi, and *dodgsoni*, GRS., from Baluchistan. I adhere to the opinion given in my list of Indian butterflies that the only *didyma* race flying in India is *chitralensis*, and that the other allied *Melitæas* are races of *trivia*, W. V. In Chitral *didyma chitralensis* and *trivia mixta*, mihi, fly together, and I think that the *trivia* race occurring from the Punjab to Baluchistan should be called *persea*, though it is possible that the Baluchistan form is worth separating under the name *dodgsoni*.

(54) *Ergolis ariadne*, Joh. The nymotypical form is from Java. Fruhstorfer describes the race that flies from the Himalayas to Burma as *pallidior*, differing in being larger and having a fiery red yellow band in the underside of the hindwing. The Southern race is *minorata*, M., described from Ceylon, smaller and with the black lines above more prominent. *Indica*, M., said to occur in Calcutta, Madras and the Nilgiris only differs from *minorata* in being slightly smaller.

(55) *Ergolis merione*, Cr., was described from the Coromandel Coast and is the form occupying the whole of South India; *taprobana*, M., can only be separated from the typical form as being slightly smaller. *Tapestрина*, M., was described from Dehra Dun and is the race that flies from Simla to Assam; it is distinguished by paleness of the dry season form and the light grey longitudinal bands below. The Burmese form is *pharis*, Fruh.; it is much lighter and more variegated above. Fruhstorfer makes no mention of the small pale form that occurs in the Central Provinces, with a dry season form that is much more variegated than any other specimens of *merione* that I have seen form anywhere in India and Burma.

(56) *Cethosia biblis*, Drury. Fruhstorfer states that *biblis* is Chinese and calls the Indian race *tisamena*; he does not say how *tisamena* differs from



*biblis*. There are three forms of the female; one like the male, a green form, *viridiana*, Fruh., and an intermediate form *mixta*, Fruh., which has the base of the forewing red, the sub-anal area being greenish, and the hindwing with the anterior half red and the basal half green.

(57) *Papilio helenus cerberus*, Fd. Jordan calls a variety of the male *eumagos*; on the underside of the forewing there is no pale sub-basal streak behind the cell. The form of female with white streaks on the forewing is *gypsothelia*, Jor., the form without these streaks is *azdia*, Jor.

(58) *Papilio helenus heliconoides*, M. The female with white streaks on the forewing is *aphnea*, Jor.; *rhyparia*, Jor., is the form without these streaks.

(59) *Papilio darsius*, Gray. *Cambyses*, Ehrm, is a variety of the male with black discal spots on the yellow patches on the hindwing.

(60) *Papilio jophon*, Gray. Jordan treats *pandiyana*, M., as a species.

(61) *Papilio coon doubledayi*, Wall. Jordan treats *Cacharensis* as an aberration.

(62) *Papilio fuscus prexaspes*, Fd. Does not occur in India, the only Indian race of *fuscus*, Goetze, is *andamanicus*, Roth., from the Andamans.

(63) *Papilio siateri*, Hew. Fruhstorfer has named a variety with white streaks on the hind wing as *jaintinus*: also ab *euephas*, a variety of race, *marginata*, Ober., with no white patches on the hind wing.

(64) *Papilio castor*, Wd. Ab *mesites*, Jor., is a variety of the male with white submarginal spots on both sides of the hind wing.

(65) *Papilio machaon asiatica*, M., ab *pendjabensis*, Eimer, are small specimens of *daladakensis*, M.

(66) *Papilio demoleus*, L. ab *demoleinus*, Ober., is the name for specimens, which have the red spot on the hind wing separated from the blue lunule by a dark spot.

(67) *Papilio demolion*, Cr. Jordan treats *liomedon*, M., as a separate species.

(68) *Papilio helenus*, L. ab *rufatus*, Jor., are specimens with the white area on the hind wing reddened.

(69) *Papilio polytes*, L. Jordan describes ab *astreans* from South India with part of the band of the hind wing suffused with blue.

(70) *Papilio bianor*, Cr. Jordan states that *gladiator*, Fruh., is merely an aberration from Tonkin: Indian specimens would appear to be true *bianor*.

(71) *Papilio polyctor ganesa*, Db. In the Khasi Hills flies ab *porphyrina*, Jor., with the submarginal spots on the hind wing enlarged.

(72) *Papilio paris*, L. The small spring form is *splendorifer*, Fruh.

(73) *Papilio aristus hermocrates*, Fd. ab *aristeoides*, Eimer = *aristinus*, Fruh. has the white discal area on the forewing restricted.

(74) *Papilio antiphates*, Fab. Jordan treats *epaminondas*, Ober., as a distinct species.

(75) *Papilio doson axion*, Fd. *praestabilis*, Fruh., is the summer form with small submarginal spots below.

(76) *Papilio eurypylus cheronus*, Fruh. Potina, Jor. = *acheron*, Fruh., is the small spring form with a broad border.

(77) *Papilio bathycles chiron*, Wall. *Ligyra*, Jor., is the spring form with large spots below and a small discal spot on the hind wing before the first median vein.

(78) *Papilio xenocles*, Db. *Theronus*, Fruh., is the spring form with the marginal area on the hind wing below pale-brown. *Xenocrates*, Fruh., is the corresponding rains form of race *phrontis*, DeN., and *neronus*, Fruh., the spring form of race *kephisos*, Fruh.

(79) *Parnassius hardwickii*, Gray. *Otos*, Fruh., is the albinotic and *harino*, Elw., the melanotic form of the typical race. *After*, Fruh., is the



melanotic, *albicans*, Fruh., the albinotic and *parva*, Verity, a small mountain form of the race *viridicans*, Fruh.

(80) *Parnassius charltonius*, Gray. *Deckerti*, Verity, is a variety with very red ocelli on the hind wing.

(81) *Prioneris clemathe*, Db. Fruhstorfer calls the race flying from the Shan States to Tenasserim *helferi*, Fd.; darker, with the veins on the underside of the forewing united by bands.

(82) *Gonepteryx zaneke*, M. Verity considers this to be a race of the Chinese *aspasia*, Men.

(83) *Pareronia valeria hippia*, Fab. The yellow variety of the female is *philomela*, Fab., not *livilla*, Fruh., as given by me.

(84) *Lycaenesthes emolus topa*, Evans. This proves to be a synonym of *Nacaduba hamptoni*, DeN., and I regret having described it.

(85) *Ilerda androcles*, Db. In separating the Eastern race as *viridis*, I am sorry to say that I overlooked the fact that the typical form was described from Sylhet; the name of the race from the Western Himalayas is *coruscans*, M., and the name *viridis* must be sunk.

(86) *Chrysophanus caspius evansii*, DeN. Swinhoe describes this insect as having a tail; in his figure the tail is omitted and Swinhoe gives a special note to say that the tail has been omitted by mistake. There is of course no tail.

(87) *Chrysophanus phloeas*, L. The Indian forms appear to fall into two perfectly distinct races, *stygianus*, But., a pale form from Baluchistan to Kashmir and *timeus*, Cr., a much darker form from Kashmir to Kumaon.

(88) *Rapala buxaria*, DeN. According to Swinhoe this should be called *rectivitta*, M.

(89) *Tajuria thyia*, DeN. Druce, P. Z. S. 1902, describes *pallescens*, a pale form from the Jaintia Hills, probably belonging to the dry season.

(90) *Tajuria drucei*. Swinhoe describes this as a new species from a unique female from the Shan States. Nearly allied to *longinus*, Fab., which Swinhoe gives as *cippus*, Fab., paler, forewing more acute: on the forewing the black border is very narrow at the dorsum and there is no black on the hind wing: the underside is much paler.

(91) *Tajuria yajna*, Doh. Swinhoe keeps *istroideia*, DeN., separate and places his *teza* as the dimorphic female of it.

(92) *Tajuria jangala ravata*, M. Swinhoe considers the very distinct race *andamanicus*, Wm. and DeN., to be inseparable from *ravata*.

(93) *Chliaria kina*, Hew. Swinhoe keeps *cachara*, M. separate giving it from Sikkim and Cachar; paler, clearer colour, forewing longer and anal angle hindwing produced: under forewing, 3 upper spots in line, second spot not shifted inwards.

(94) *Chliaria watsoni*. Swinhoe describes this as a new species from the Karen Hills, only the male known. Closely allied to *merguia*, Doh., but above purple not blue, the black border narrow and not even, but narrowing towards the dorsum. It would appear to be the dry season form of *merguia*.

(95) *Biduanda thesmia*, Hew. Swinhoe gives this as *fabricii*, M. The Indian form should stand as *thesmia fabricii*.

(96) *Marmessus lysias*, Fab. Swinhoe records in addition *moorei*, Dist., the Malay race, which Doherty is said to have obtained in Mergui: it differs in having no red band in the male and a very narrow one in the female.

(97) *Cheritra freja jaffra*, But. Swinhoe keeps the Ceylon form separate as *pseudo-jaffra*, M.: smaller and more silvery white below.

(98) *Orthopaetus phanaeus*, Hew. According to Swinhoe this insect does not occur in India and what Watson called *phaneus* was really *lalita*, Doh.



- (99) *Capila zennara*, M. Swinhoe places this in *Pisola*.
- (100) *Celaenorrhinus clitus*, Leech. The Chinese form has dark antennæ, while the Indian form has them white in front and should be known as *aspersa*, DeN.
- (101) *Celaenorrhinus pyrrha*, DeN. Swinhoe keeps *patula* and *plagifera*, DeN., separate, and as far as I can judge from DeNiceville's types quite rightly. The antennæ are white in front in the male of *sumitra*, M., and in both sexes of *patula*; they are dark in front in *pyrrha* and *plagifera*, the latter being a larger insect with larger spots on the hindwing.
- (102) *Celaenorrhinus munda*, M. Swinhoe gives this as a synonym of *leucocera*, Koll., but I think it is quite distinct. He keeps *putra*, M., from N. E. India and Burma separate from *leucocera*: with all the spots much reduced. I have failed to recognize two forms from this part of India, but specimens from Southern India certainly have the markings reduced; the type of *putra* came from Bengal and perhaps this name might be applied to the race from districts South of the Himalayas.
- (103) *Celaenorrhinus fusca*, Hamp. Swinhoe says that the correct name for this is *area*, Plotz.
- (104) *Celaenorrhinus asmara*, But. The type came from Malacca: according to Fruhstorfer the Assam race should be called *consertus*, DeN., and the Burmese race *cacus*, DeN.
- (105) *Coladenia indrani*, M. The race *tissa*, M., with the *cilia* on the hindwing unchequered, is confined to Ceylon. Specimens from the Himalayas are always paler than Central and South Indian ones, but perhaps there is no need to differentiate between them. Specimens from Burma, however, are golden yellow on the hindwing above and have been called *uposathra*, Fruh. Swinhoe states that this name is only applicable to the dry season form of *indrani*.
- (106) *Coladenia dan*, Fab. The type is from South India and Swinhoe records it from Burma as well. Fruhstorfer calls the Burmese race *dan dhyana*. From the Himalayas Swinhoe gives *fatih*, Koll., as a separate species; Fruhstorfer calls this *dan fatih*. *Fatih* is said to differ from *dan* in being bigger and brighter, with much larger hyaline spots; the spot in 1 on the forewing is hyaline, while the spot in the cell is large and single not small and double.
- (107) *Coladenia hamiltonii*, DeN. Swinhoe places this in the genus *Gerokis*, Mabille.
- (108) *Tapena thwaitesi*, M. Swinhoe places *minuscule* and *hampsoni*, El. and Ed., as synonyms, as the only difference is in the genitalia.
- (109) *Caprona*. Swinhoe calls this *Abaratha*: he puts *saraya*, Doh., as a separate species from Kumaon, South India and the Punjab.
- (110) *Tagiades helferi ravi*, M. Swinhoe keeps *helferi*, Ed., as a separate species. The correct name for the continental form is *atticus*, Fab., *khasiana*, M., and *khasiana ravina*, Fruh. *Helferi* is certainly conspecific and should be called *atticus helferi*.
- (111) *Tagiades alica*, M., etc. Swinhoe restricts *alica* to the Andamans, the Burmese form he calls *meetana*, M., the Ceylon form *distans*, M., and the South Indian form *obscurus*, Mab.
- (112) *Tagiades atticus*, Fab. Aurivillius has discovered that this name should be applied to the butterfly hitherto known as *ravi*, M.; *litigiosa*, Moschler, is the oldest name for what has been known as *atticus*. Swinhoe keeps separate *menaka*, M. = *vulturna*, Plotz, from Kashmir to Upper Burma; it has 8, not 10, spots on the forewing and a prominent black spot on the white area of the hindwing. Fruhstorfer calls the South Indian and Ceylon race *menaka vujuna*.



(113) *Tagiades dealbata*, Dist. Swinhoe calls this *pteria*, Hew., and Fruhstorfer *pteria dealbata*: the type of *pteria* came from the Phillippines.

(114) *Tagiades pralaya*, M. Fruhstorfer treats this as a race of *trichoneura*, Fd.

(115) *Satarupa*. Swinhoe places all, except *gopala*, M., and the *sambara* group in *Eaimio*.

(116) *Satarupa* (Daimio) *milliana*. Swinhoe describes this as a new species from the Shan States and Pegu: it is apparently very closely allied to *bhagava*, M., there are numerous spots and the two spots on the costa of the hindwing and the four lower spots on the forewing are very prominent.

(117) *Satarupa sambara*, M. Swinhoe places *dohertyi*, Wat., as a synonym. He states that *affinis*, Druce=*var cognata*, Dist., does not occur in India and names the Indian form *kirmana*.

(118) *Sarangesa dasahara*, M. Swinhoe describes as a new species *davidsoni* from Mahableshwar and Kanara: smaller than *dasahara*, paler, cilia white not dark, hyaline spots on both sides more prominent.

(119) *Sarangesa albicilia*, M. Swinhoe describes as a new species *hampsoni* from the Nilgiris, closely allied to *albicilia*, but differing somewhat above.

(120) *Carcharodus*. Swinhoe gives *alcea*, Esp., from Chitral: *swinhoei*, Wat., from Baluchistan, Chitral and the N. W. Himalayas; *dravira*, M., from Baluchistan, Afghanistan and the N. W. Himalayas.

(121) *Hesperia*. In this genus Swinhoe only places *cashmirensis*, M. In *Spialia*, Nov., he puts *galba*, Fab., *zebra*, But., *geron*, Wat., and *sao*, Berg., the latter is what I have recorded as *orbifer*, Hub. In *Pyrgus* he places *poggei*, Led.=*standingeri*, Freyer, recording it from Baluchistan and Chitral, *poggei* does not, I think, occur in Chitral and the specimens I recorded from there as *standingeri* turned out to be *Carcharodus althea*, Hub.

(122) *Sancus pulligo*, Mab. The type came from the Malay Peninsula and the Indian race should be called *subfasciatus*, M.

(123) *Astictopterus henrici*, Holland. The typical Chinese form is darker than the Indian race, which should be called *kada*, Swin.

(124) *Suastus gremius*, Fab. Swinhoe treats *subgrisea*, M., as a separate species from Ceylon, where it flies with *gremius*.

(125) *Taractrocera archias*, Fd. The type came from Aboina: Swinhoe describes the Indian form as a new species under the name *quinta*.

(126) *Taractrocera ziclea*, Plotz. The type came from the Phillippines and Fruhstorfer has named the Indian race *samadha*.

(127) *Ampittia maro*, Fab. Swinhoe gives this under the older name *dioscoroides*, Fab.

(128) *Aeromachus*. In this genus Swinhoe places *stigmata*, M., and *dubius*, El. and Ed.; *discreta*, Plotz., he regards as a synonym of *stigmata*. In *Machacus*, Nov., *jhora*, DeN., *kali*, DeN., and *indistincta*, M.; *obsoleta*, M., he puts as a synonym of *indistincta*.

(129) *Pedestes sala*, Hew. Swinhoe put *sala* as a synonym of *Suastus aditus*, M., and calls this insect *submaculata*, Stdg., placing *maculicornis* and *fuscicornis*, El. and Ed., as synonyms of it. See my note on this species in my "List".

(130) *Zographetus ogygia*, Hew. Swinhoe considers *flavipennis*, DeN., to be a separate species as there is a prominent spot at the end of the cell.

(131) *Scobura phiditia*, Hew. This apparently does not occur in India.

(132) *Erionota thrax acroleuca*, W. M. and DeN. Swinhoe gives *acroleuca* as a distinct species from Sikkim, Assam, South India, the Andamans and Nicobars.

(133) *Erionota batara*, M. Swinhoe gives this as *attina*, M.



- (134) **Kerana**. Swinhoe re-names this *Tamela*.  
 (135) **Stimula**. This unfortunate genus started life as *Watsonia*, El. and Ed., the name was found to be pre-occupied and changed to *Stimula* DeN., Bery has discovered that this also is pre-occupied and has re-named it *Watsoniella*.  
 (136) **Plastingia callineura**, Fd. Swinhoe considers this doubtfully Indian; he adds *latoia*, Hew., to the list of Indian butterflies on the strength of a specimen caught on Sullivan Island.  
 (137) **Plastingia idyalis**, DeN. Not Indian according to Swinhoe.  
 (138) **Plastingia pugnans**, DeN. This was described from Borneo; Swinhoe records it from the Ataran Valley. Tenasserim.  
 (139) **Lotongus zeus**, DeN. The type was from Borneo; Fruhstorfer states that the Indian form is different and names it *zeus optimus*; Swinhoe gives it as *Zela optimus*.  
 (140) **Zea taprobanus**, Plotz. Not an Indian butterfly.  
 (141) **Hidari irava**, M. Swinhoe states that the oldest name for this butterfly is *thrax*, Hub. (nec. Linnaeus).  
 (142) **Pithauria aitchisonii**, W. M. and DeN. Swinhoe gives this as *Pithauriopsis marsena*, Hew. *Marsena* was described from a female and *aitchisonii* from a male; Piepers, in Java, captured the two in copula.  
 (143) **Notocrypta feisthamellii**, Bdl. Swinhoe gives this from India, Burma, Ceylon and the Andamans. Also as separate species *restricta*, M., from India, Burma and Ceylon and *albifascia*, M., from Burma.
10. Mr. W. M. Crawford, I.C.S., recently sent me some butterflies caught by him in January 1913 in the Meghasani Hills, 3,800 feet, Morbhanj District, Orissa. Amongst them were the following butterflies, which have not, as far as I know, been recorded from South of the Himalayas, viz: *Apatura parisatis*, God.; *Parhestina persimilis*, Wd.; *Papilio helena cerberus*, Fd.; *Papilio chaon*, Wd.; *Papilio paris*, L.; *Papilio doson axion*, Fd. The last butterfly has also been caught in Sambalpur where Mr. Crawford has lately obtained a female of *Appias libythea*, Fab. The single specimen of *P. helena cerberus* that was obtained is a male with a post-discal row of prominent black spots on the yellow area of the hind wing thus resembling *Papilio darsius*, Gray; ab *cambyses*, Ehrm. The specimens of *P. paris* resemble the small cold weather form of this insect, but with the green patch on the hind wing enlarged, thus approaching the Southern race *tamilana*, M.



## DESCRIPTIONS OF INDIAN MICRO-LEPIDOPTERA.

BY

E. MEYRICK, B.A., F.R.S., F.Z.S.

## XVII.

(Continued from page 182 of this Volume.)

## TORTRICIDÆ.

*Ulodemis falsa*, n. sp.

♂ ♀. 22-25 mm. Head, palpi, and thorax brown, in ♂ with a blackish patch on upper part of face. Antennæ of ♂ without notch. Abdomen grey. Forewings sub-oblong, in ♂ slightly narrowed anteriorly, costa anteriorly strongly arched, without fold, posteriorly nearly straight, apex obtuse, termen in ♂ nearly straight, little oblique, in ♀ sinuate, nearly vertical; brown, strewn with blackish-grey dots, arranged in oblique transverse series; markings darker, edged with faint pale striæ; outer edge of basal patch straight, oblique; central fascia moderate, oblique, slightly narrower towards costa, anterior edge nearly straight, posterior slightly bent in middle; costal patch small, semi-oval, obsolete posteriorly: cilia dark-brown, at apex and towards tornus greyish-ochreous. Hindwings rather dark-grey, rather thinly scaled, except towards termen; in ♂ with a dorsal pencil of long dark-grey hairs, and on lower surface with a shallow naked prismatic groove running beneath lower margin of cell and along vein 2.

Nilgiris, 3,500 feet, from August to October (Andrewes), 9 specimens (5 ♂, 4 ♀); also 1 ♂ from Ceylon, without further particulars. Almost exactly resembling *trigrapha* in all particulars both of structure and markings, except in absence of notch of antennæ in ♂, and in slight difference of posterior edge of central fascia, which in *trigrapha* forms a very slight but regular curve, in *falsa* is distinctly bent in middle and faintly sinuate above this. Besides the original examples I have a pair (♂ ♀) from Khasi Hills which are truly referable to *trigrapha*. This is a very curious case, but on the structural difference I cannot treat these forms otherwise than as specifically distinct.

## EUCOSMIDÆ.

*Argyroploce æolantha*, n. sp.

♂ ♀. 14-17 mm. Head and thorax dark fuscous suffusedly spotted with fulvous-orange. Palpi with appressed scales, curved, ascending, orange. Abdomen orange, segmental margins dark-fuscous. Forewings moderate, sub-oblong, slightly dilated posteriorly, costa gently arched, apex obtuse, termen slightly rounded, somewhat oblique, deep fulvous-orange, strewn with about twenty irregular dark indigo-blue-grey spots and marks edged with some black scales, and some scattered minute black strigulæ between these: cilia fulvous-orange, with several partially indicated dark bars. Hindwings orange-yellow; dorsal and subdorsal streaks of blackish suffusion, and costal whitish space edged beneath with blackish; an interrupted streak in disc sometimes more or less indicated; a broad blackish terminal band; cilia orange, base blackish.

Khasis, in October; Baco River, Mindoro, Philippines, in February; two specimens. Allied to *solaris* and *eximiana*.

*Argyroploce liochlora*, n. sp.

♂. 15 mm. Head, palpi, and thorax dull green mixed with blackish. Antennæ simple. Abdomen dark-fuscous, beneath yellowish. Forewing.



elongate, rather dilated posteriorly, costa gently arched, apex obtuse, termen slightly rounded, little oblique; light bluish-green; costa shortly and indistinctly strigulated with blackish; basal patch yellow-green, edge obtusely angulated in disc, its dorsal margin suffused with blackish; central fascia moderate, oblique, yellow-green, narrowed at extremities, posterior edge somewhat irregular, slightly marked with blackish and towards middle edged with white; wing beyond this wholly light-dull purple marbled with leaden-bluish, with some broken dark fuscous strigæ partially edged with whitish, and an irregularly triangular blackish-fuscous partially whitish-edged blotch with one angle resting on middle of termen: cilia bluish-fuscous, base dark fuscous; with subbasal and apical series of minute white specks. Hindwings dark-fuscous; cilia fuscous becoming light-bluish-grey towards apex, with darker basal line.

Ganesh Gudi, Kanara, in May (Maxwell), one specimen.

*Laspeyresia toroetia*, n. sp.

♂ ♀. 9-10 mm. Head light greyish-ochreous. Palpi very pale greyish-ochreous. Thorax-light bronzy greyish-ochreous. Abdomen dark-grey. Forewings elongate, rather dilated posteriorly, costa gently arched, apex obtuse, termen nearly straight, slightly oblique; purplish-grey or purplish-fuscous, irregularly mixed or marked with dark-fuscous suffusion in disc and towards dorsum; costa marked with oblique whitish strigulae, with several longer dark-fuscous strigæ between these, one from  $\frac{2}{3}$  of costa running to termen above middle; a triangular ochreous-white blotch on middle of dorsum, its apex somewhat produced a little obliquely posteriorly; ocellus margined laterally by obscure violet-lead-grey streaks, and containing about four black dots or short linear marks: cilia fuscous sprinkled with whitish specks, with dark fuscous subbasal line. Hindwings dark-fuscous; cilia whitish, with dark-fuscous basal shade.

Coimbatore, and in Malabar, bred in December and January (Fletcher); eight specimens, larva pale-green, head reddish; burrows into the growing tips of stem of *Dolichos lablab* (*Leguminosae*), causing it to droop and die; pupation within the burrow (Fletcher).

*Laspeyresia pycnota*, n. sp.

♀. 10 mm. Head fuscous, face whitish. Palpi whitish, second joint loosely rough-scaled. Thorax and abdomen rather dark-fuscous. Forewings sub-oblong, costa gently arched, slightly bent in middle, apex obtuse, termen almost straight, rather oblique; dark-fuscous, crossed by thick dark-lead lines angulated in disc, on posterior half of costa rising from four pairs of whitish strigulae, first of these running to ocellus, others confusedly to termen; ocellus indicated by leaden-metallic lateral approximated streaks, without dots: cilia fuscous, with blackish subbasal line. Hindwings rather dark-fuscous; cilia light-fuscous, with dark-fuscous subbasal line.

Yellapur, Kanara, in October (Maxwell), two specimens.

#### GELECHIADÆ.

*Frisilia verticosa*, n. sp.

♂ ♀. 23-24 mm. Head and thorax pale-yellow-ochreous, thorax sometimes tinged with brownish. Palpi in ♂ ochreous-yellowish, base and apex infuscated, in ♀ with second joint yellowish, basal  $\frac{2}{3}$  infuscated, terminal joint whitish-ochreous with anterior edge dark-fuscous. Antennæ whitish-ochreous, more or less infuscated towards base. Abdomen whitish-ochreous. Forewings elongate, rather narrow, especially in ♀, posteriorly rather dilated, costa slightly arched, apex obtuse, termen faintly sinuate, rather oblique; 3 and 4 out of 2, 7 and 9 stalked, 8 absent, yellow-ochreous, sometimes partially tinged with brownish, more or less sprinkled with dark-



fuscous; base of wing in ♂ more or less suffused with dark-fuscous; first discal stigma blackish; in ♂ a patch of dark-fuscous suffusion along median third of dorsum, anteriorly with an oblique extension across fold towards base of costa, posteriorly emitting a suffused dark-fuscous streak across wing towards costa at  $\frac{1}{2}$ , more or less obsolescent towards costa, second discal stigma sometimes apparent as a darker mark on anterior edge of this; in ♀ these markings are hardly traceable, but second discal stigma is distinct; a more or less developed streak of fuscous suffusion along termen, in ♀ faint: cilia light yellow-ochreous. Hindwings whitish-ochreous, faintly fuscous-tinged towards apex and on termen; a grey discal dot on end of cell; cilia pale whitish-ochreous.

Pykara, Nilgiris, 6,500—7,000 feet, from March to May (Andrewes); eight specimens.

*Hypelictis albiscripta*, n. sp.

♂. 14 mm. Head and thorax dark ashy-fuscous. Palpi with second joint bronzy, broadly dilated with appressed scales, strongly compressed laterally, terminal joint deep purple, considerably thickened with scales, projecting posteriorly towards apex, appearing obtuse. Abdomen fuscous. Forewings elongate, narrow, costa slightly arched, apex obtuse, bent down, termen obliquely rounded; 6 to apex, 8 absent; dark-slaty-fuscous, with violet reflections, veins sprinkled with blackish; stigmata small, whitish, plical beneath first discal; a very fine interrupted whitish line from  $\frac{3}{4}$  of costa to tornus, obtusely angulated above middle; a pale ochreous apical patch, anterior edge nearly straight, enclosing two or three dark-grey longitudinal marks: cilia dark-ashy-grey, round apical patch with basal half pale-ochreous barred with dark-grey. Hindwings light-bronzy fuscous; cilia paler, with a basal pale-ochreous dot at apex.

Anshi, Kanara, bred in January (Maxwell); one specimen. Reared from a pupa found between closely-spun leaves of *Salix*; some very young larvae feeding between similarly spun leaves were probably the same species (Maxwell).

*Pachnistis arens*, n. sp.

♀. 13 mm. Head and thorax pale-greyish ochreous. Palpi ochreous-whitish sprinkled with grey. Abdomen light-grey. Forewings elongate, rather narrow, costa gently arched, apex obtuse, termen obliquely rounded; pale-greyish ochreous irrorated with light fuscous; discal stigmata moderately large, fuscous, rather approximated, plical smaller, hardly before first discal: cilia pale greyish ochreous sprinkled with pale-fuscous. Hindwings ochreous-whitish slightly sprinkled with pale-grey; cilia ochreous-whitish.

Pusa, Bengal, in June (Fletcher); one specimen.

*Pachnistis monodryas*, n. sp.

♂ ♀. 24-27 mm. Head fuscous, sides of crown orange-ochreous, face pale-ochreous. Palpi fuscous, posteriorly light-ochreous. Antennæ whitish ochreous. Thorax rather dark-purple fuscous. Abdomen pale fuscous. Forewings elongate, posteriorly slightly dilated, costa gently arched, apex rounded-obtuse, termen rounded, little oblique; rather glossy ochreous-fuscous, with a faint purple tinge: cilia brownish. Hindwings rather light-fuscous; cilia light-brownish.

Nilgiris, 3,500 feet, in August and November (Andrewes); two specimens.

*Brachmia crypsilychna*, n. sp.

♂. 15 mm. Head ochreous, crown fuscous-tinged, collar dark-slaty-fuscous. Palpi pale-ochreous, terminal joint sprinkled with dark-fuscous. Antennæ dark-fuscous, serrate, ciliations  $\frac{1}{2}$ . Thorax dark-slaty-fuscous. Posterior legs dark fuscous, with whitish-ochreous rings at apex of joints and middle of tibiae. Forewings elongate, rather narrow, costa gently arched, apex obtuse, termen slightly rounded, rather oblique; 2 and 3



stalked, 7 and 8 stalked, 7 to apex; dark-slaty-fuscons, somewhat sprinkled with blackish; a large blackish dot beneath costa near base; plical and first discal stigmata represented by round blackish adjacent spots placed transversely; second discal represented by a somewhat 8-shaped spot outlined with blackish suffusion and filled in with pale fuscous-ochreous; an ochreous-whitish dot on costa at  $\frac{3}{4}$ ; some blackish scales along posterior part of costa and termen: cilia grey, sprinkled with whitish. Hindwings light-grey, tinged with ochreous anteriorly; cilia pale-grey.

Bassein Fort, Bombay, bred in October (Fletcher); one specimen. Larva tapering much posteriorly and slightly anteriorly, black; collar banded with white; plate of 2 smoky-black with a triangular brownish-yellow space; second and third interstices creamy-white, next three dull-brown: 7, 8 and 10-12 with V-shaped creamy marks between spun leaves of *Ipomoea arvensis* (*Convolvulaceae*) (Fletcher).

*Brachmia insulsa*, n. sp.

♂ ♀. 12-16 mm. Head and thorax pale-greyish ochreous. Palpi whitish-ochreous, second joint dark-fuscous except apex. Antennae  $\frac{3}{4}$ , greyish-ochreous, ciliations in ♂  $\frac{1}{2}$ . Posterior tibiae whitish-ochreous, beneath fuscous. Forewings elongate, posteriorly slightly dilated, costa slightly arched, apex obtuse, termen somewhat rounded, rather oblique; 2 and 3 stalked, 7 and 8 stalked, 7 to apex; light greyish-ochreous; stigmata dark-fuscous, plical slightly before first discal; some cloudy dark-fuscous dots round apex and termen, sometimes almost obsolete: cilia whitish-ochreous slightly sprinkled with fuscous. Hindwings ochreous-grey-whitish; cilia ochreous-whitish.

Pusa, Bengal, from April to July (Fletcher); six specimens. Allied to *episticta*.

*Chelaria scopulosa*, Meyr.

Larva burrows in shoots of *Careya arborea*, showing some excrement on opening of hole; only one found, though often searched for (Maxwell).

*Anarsia melanoplecta*, n. sp.

♂. 10 mm. Head and thorax whitish-grey. Palpi with second joint blackish on basal half, then with several whorls of blackish white-tipped scales, tuft grey-whitish mixed with fuscous, terminal joint whitish with fine oblique black lines. Abdomen grey. Forewings elongate, narrow, costa gently arched, apex obtuse, termen extremely obliquely rounded; fuscous finely irrorated with whitish; an obscure darker blotch in disc about  $\frac{1}{2}$ ; a thick black oblique streak from middle of costa, reaching half across wing; a semi-oval black spot on costa at  $\frac{4}{5}$ ; a black preapical dot, preceded by whitish, area above and below it tinged with ochreous: cilia whitish with rows of dark-fuscous points, basal third grey limited by a dark-grey shade interrupted with whitish bars. Hindwings grey; cilia light grey.

Pusa, Bengal, bred in May (Fletcher); one specimen. Larva boring into shoots of mango (*Mangifera indica*) (Fletcher).

*Anarsia sagittaria*, n. sp.

♂ ♀. 13-15 mm. Head pale greyish-ochreous. Palpi dark-fuscous, apical edge of second joint whitish-ochreous, terminal joint of ♀ whitish-ochreous with dark-fuscous basal and suprmedian rings. Thorax pale greyish-ochreous, longitudinally streaked with blackish. Abdomen light greyish-ochreous. Forewings elongate, narrow, costa gently arched, apex obtuse, termen very obliquely rounded; light fuscous, slightly sprinkled with ochreous-whitish; some scattered black scales here and there on veins; a black streak along submedian fold, strong on basal half, attenuated posteriorly; a blackish mark beneath this at base; a slender black longitudinal streak in disc from before middle to  $\frac{3}{4}$ , reduced to scattered scales posteriorly; a slender subdorsal streak of black irroration from  $\frac{1}{2}$



to  $\frac{3}{4}$ : cilia grey sprinkled with ochreous-whitish. Hindwings grey, paler and thinly scaled anteriorly; in ♂ an expansible pencil of long fine blackish hairs from disc near base: cilia whitish-ochreous-grey. Forewings beneath in ♂ with expansible pencil of long fine blackish hairs from disc near base.

Pusa, Bengal, in June (Fletcher); two specimens.

*Trichotaphe geochrota*, n. sp.

♂. 13 mm. Head and thorax lilac-fuscous. Palpi whitish, second joint dark-fuscous except apical edge, scales roughly expanded towards apex above, anterior edge of terminal joint dark-fuscous. Antennæ serrate, ciliations 2. Abdomen grey. Forewings elongate, rather narrow, costa gently arched, apex obtuse, termen slightly rounded, oblique; light ash grey irrorated with fuscous; extreme costal edge ochreous-whitish; a cloudy dark-brown dot in disc at  $\frac{1}{4}$ ; stigmata dark brown, obscure, discal approximated, plical hardly before first discal, second discal connected with dorsum by an irregular dark brown line; a fine indistinct irregular ochreous-whitish transverse line at  $\frac{1}{2}$ , forming a small distinct spot on costa; several blackish dots round apex and termen: cilia pale fuscous, base obscurely spotted with whitish-ochreous suffusion. Hindwings grey; cilia light-grey.

Bassein Fort, Bombay, in October (Fletcher); one specimen.

#### COSMOPTERYGIDÆ.

*Cosmopteryx semnota*, n. sp.

♂. 11-12 mm. Head and thorax dark-bronze, with three very fine whitish lines, face light shining bronze. Palpi white lined with black. Antennæ blackish, towards base with dotted white line, with two fine white rings near apex and two others about  $\frac{3}{4}$ . Abdomen dark bronzy-grey. Posterior tibiæ blackish with white median and apical rings. Forewings narrowly elongate-lanceolate, apex slenderly long-caudate; dark-bronzy-fuscous; a fine white oblique subcostal line from base to  $\frac{1}{4}$ , and short median and subdorsal lines beneath posterior portion of this, each reaching somewhat beyond the one above it; a lighter bronzy-fuscous postmedian transverse band, tinged with ochreous towards costa, edged by violet-golden fasciæ, first vertical, followed above middle by a large black dot, second inwardly oblique, narrowed or almost interrupted in disc; a sinuate ochreous-yellow line running from middle of this to apex: cilia rather dark fuscous, with a white bar at apex, and a white spot on costa on posterior edge of band. Hindwings dark-fuscous; cilia rather dark-fuscous.

Pykara, Nilgiris, 7,000 feet, in April (Andrewes); two specimens. Distinct by the bronzy-fuscous band.

*Trissodoris*, n. g.

Head smooth-scaled, forehead rather prominent between antennæ, face flat, somewhat retreating, crown rather depressed, side tufts slightly raised; ocelli absent; tongue developed. Antennæ 1, in ♂ somewhat thick, simple, basal joint long, somewhat dilated with scales, with slight pecten. Labial palpi very long, recurved, somewhat diverging, second joint thickened with rather rough scales towards apex beneath, terminal joint longer than second, acute. Maxillary palpi very short, filiform, appressed to tongue. Posterior tibiæ with rough projecting scales from base to  $\frac{1}{4}$  and apical group of expanded bristly scales, spurs with fine pecten of scales, tarsi with rough projecting tuft of scales above on basal joint, and somewhat roughened with scales throughout. Forewings with 16 furcate, 2 remote, 3-5 approximated, 7 and 8 out of 6, 7 to costa, 11 from middle. Hindwings  $\frac{3}{4}$ , narrow-lanceolate, cilia 4; 2-5 remote, parallel, 6 and 7 connate.



*Trissodoris honorariella*, Wals.

(*Stigmatophora honorariella*, Wals., Faun. Haw. 1, 515, pl. XV, 21; *S. quadrifasciata*, Wals., *ibid.* 516, pl. XV, 22.)

Ambulangoda, Weligama and Barberyn Island, Ceylon, from January to March (Fletcher). Occurs also in New Guinea and the Pacific Islands, and is probably attached to some cultivated plant. I have examples from the localities quoted by Lord Walsingham; there is only one species, the colour characters being variable, and the curious tuft on undersurface of forewings always present in ♂ but absent in ♀.

#### EPIMARPTIDÆ.

The following curious genus may, I think, be regarded as the type of a new family, since I am unable to refer it to any existing group without doing violence to established characters. It differs from the *Cosmopterygidae* by the terminal ending of vein 7 of forewings, and the structural features of the antennæ and palpi are peculiar. Superficially it has some resemblance to the *Heliodinidæ* (*Stathmopoda* group), but does not show the characteristic leg-structure of that family, nor agree in other respects, and even the markings are really different, being based on the stigmata, which are never exhibited in the *Heliodinidæ*. Probably it is a development of the *Oecophoridae*.

*Epimarptis*, n. g.

Head smooth, rounded; ocelli present; tongue developed. Antennæ nearly 1, in ♂ simple, near base of stalk with a notch covered by an oblique tooth beneath it, basal joint elongate, without pecten. Labial palpi long, curved, ascending, with appressed scales, second joint with a projecting pencil of scales at apex above, terminal joint shorter than second, acute. Maxillary palpi very short, filiform, appressed to tongue. Posterior tibiae rough-haired above. Forewings with 2-5 very short, approximated, 6 and 7 out of 8, 7 to termen, 11 from middle. Hindwings  $\frac{1}{2}$ , narrow-lanceolate, cilia 4; 2-4 parallel, 5 absent, 6 and 7 stalked.

*Epimarptis philocoma*, n. sp.

♂. 11 mm. Head ochreous whitish, crown slightly tinged with fuscous on sides, and behind with pale yellow. Palpi whitish, sprinkled with dark-fuscous. Antennæ whitish. Thorax pale yellow. Abdomen pale whitish-ochreous. Forewings narrowly elongate-lanceolate, widest near base, long-pointed; clear brassy-yellow; basal third of costa sprinkled with dark-fuscous; an ochreous-brown triangular patch with violet reflections extending along posterior half of dorsum and termen to apex, reaching more than half across wings, anterior edge obliquely marked with two silvery-lilac spots sprinkled with blackish representing plical and first discal stigmata, plical anterior; a less marked similar spot above tornus apparently representing second discal stigma; cilia yellow-ochreous, beneath tornus tinged with fuscous, on termen and dorsum sprinkled with dark-fuscous on basal third. Hindwings grey; cilia light-greyish-ochreous.

Karwar, Kanara, bred in September (Maxwell); one specimen. Larva reddish (including head); lives in a white web on midrib of an unknown plant, the web being on both sides of the leaf, kept off the surface by little pillars of excrement; the webs on either surface of the leaf are connected by holes through the leaf itself, and the larva uses these alternative apodes as a means of escaping observation, dodging through the holes with much agility: cocoon separate, close to midrib, oval, resembling a bird-dropping (Maxwell). These singular and interesting habits confirm the peculiarity of the type.



## INDIAN MICRO-LEPIDOPTERA.

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## ECOPHORIDÆ.

*Tonica teratella*, Walk.

Pupa erect on its tail, exposed; found on a leaf of bamboo (Maxwell).

*Cryptolechia arvalis*, Meyr.

Larva greyish-green, head black; feeds between two or more leaves of *Careya arborea*, spun together so as to adhere flatly; pupates in same position; abundant in larval stage, but never met with on the wing (Maxwell).

## PHYSOPTILIDÆ.

I propose this new family for the following genus, which at present stands isolated as a peculiar type. I suppose it to be a derivative of the *Xyloryctidæ*, from which it may be technically distinguished by the absence of vein 6 of hindwings.

*Physoptila*, n. g.

Head smooth, densely scaled, side tufts erect; ocelli absent; tongue short. Antennæ 5, in ♂ minutely ciliated, basal joint elongate, without pecten. Labial palpi long, recurved, very widely divergent, second joint thickened with dense scales gradually expanded and somewhat rough beneath towards apex, terminal joint much shorter than second, thickened with loose scales, acute. Maxillary palpi rudimentary. Thorax with strong posterior crest. Posterior tibiae clothed with dense long rough hairs above and beneath. Forewings with tufts of raised scales on surface, apex strongly caudate; 1b long-furcate, 2 from towards angle, 3 from angle, 4 somewhat approximated to 3, weak, 5 from middle of transverse vein, 6 absent (obsolete), 8 absent (coincident with 7), 7 to apex, 9 and 10 from near end of cell, 11 from middle. Hindwings under 1, subtrapezoidal, apex long produced, termen deeply sinuate, cilia  $1\frac{1}{2}$ ; 2 rather curved, 3 and 4 very long-stalked from angle, 5 from middle of transverse vein, 6 absent, 7 to apex.

*Physoptila scenica*, n. sp.

♂ ♀. 11-13 mm. Head ochreous-whitish; palpi ochreous-whitish, terminal joint with more or less indicated fuscous subbasal and subapical rings. Antennæ whitish, with grey band at  $\frac{2}{3}$  and two narrower ones towards apex. Thorax whitish, with irregular zigzag light ochreous antemedian and postmedian transverse bars. Abdomen whitish-ochreous more or less tinged with grey. Forewings elongate, costa gently arched, apex very long-produced, falcate-caudate, termen concave beneath it, then obliquely rounded; ochreous-whitish; an irregular streak of yellow-ochreous suffusion along fold throughout, and some irregular lighter patches on dorsal area; discal stigmata indicated by undefined spots of yellow-ochreous suffusion, sometimes with a few black specks, plical by a short fine linear mark of black scales, very obliquely before first discal; a patch of raised (probably erectile) whitish scales beneath fold in middle of wing; a slightly projecting tuft of raised scales on middle of costa, preceded by a blackish dot, from about which proceed two very oblique obscure pale ochreous streaks running together into apex; an irregular transverse brown blotch on costa at  $\frac{2}{3}$ , reaching rather more than half across wing, crossing these: cilia whitish-ochreous, at base beneath apical prominence with a few black specks. Hindwings grey, thinly scaled and subhyaline in disc and towards base; cilia light-greyish-ochreous.

Karwar, Kanara, bred in July (Maxwell); four specimens. Larva feeding internally in young (but not quite new) shoots *Careya arborea*; can be detected by excrement protruded in a bunch from the original entrance-hole in stem (Maxwell).



## XYLORYCTIDÆ.

*Amorbaea galbanaea*, n. sp.

♀. 30-32 mm. Head orange, forehead and face whitish except on sides. Palpi light-yellowish. Thorax rather dark-purplish-fuscous. Abdomen dark-fuscous. Forewings elongate, costa gently arched, apex obtuse, termen obliquely rounded; 3 and 4 separate; rather dark fuscous, with a faint purplish or ochreous gloss; extreme costal edge ochreous-whitish: cilia fuscous, tips pale. Hindwings dark fuscous; cilia fuscous.

Maskeliya, Ceylon, from February to April (Green, Alston); three specimens. This differs from the two previously described species of the genus in having veins 3 and 4 of forewings separate, instead of stalked, the same variation occurs within the limits of the allied genus *Ptochoryctis*, but the genera are natural without further subdivision.

*Metathrinca memnon*, n. sp.

♂. 24 mm. Head, palpi, and antennæ blackish, second joint of palpi suffused with whitish anteriorly. Thorax silvery-white. Abdomen whitish. Forewings elongate, costa gently arched, apex obtuse, termen obliquely rounded; silvery-white; costal edge blackish towards base; a slender slightly curved blackish streak from dorsum beyond middle, reaching about half across wing; several very fine linear dark-fuscous marks round apex and termen: cilia white. Hindwings and cilia ochreous-whitish.

Hakgala, Ceylon, in April (Green); one specimen.

*Ptochoryctis anguillaris*, n. sp.

♂ ♀. 12-15 mm. Head, palpi, and thorax, white. Antennæ blackish. Abdomen grey-whitish. Forewings elongate, costa gently arched, apex obtuse, termen very obliquely rounded; silvery-white; 3 and 4 separate; a curved dark-fuscous streak running from  $\frac{2}{3}$  of costa to near apex; a dark fuscous streak running along termen from near beneath apex of preceding to tornus, where it is expanded into an oblique bilobed fasciaform marks reaching to middle of disc: cilia white, with dark-fuscous subbasal line, and apical third fuscous. Hindwings ochreous-white; cilia white.

Hambantota and Maskeliya, Ceylon, in October and December (Fletcher, Alston); two specimens.

*Ptochoryctis parabola*, n. sp.

♀. 25 mm. Head, palpi, thorax and abdomen white, palpi infuscated above towards base. Forewings moderately elongate, costa moderately arched, apex obtuse, termen rounded, rather oblique; 3 and 4 stalked; silvery-white; costal edge dark-fuscous towards base; dorsal area tinged with ochreous; a submarginal series of blackish dots round apex and termen, that between veins 5 and 6 absent, one on each side of this minute, one above apex and two nearest tornus large: cilia white. Hindwings ochreous-white; cilia white.

N. Coorg, 3,500 feet in May (Newcome); one specimen. Similar to *rosaria*, but in that species the palpi are blackish, and the submarginal dots uniform and complete.

*Ptochoryctis illuvialis*, n. sp.

♀. 28 mm. Head and thorax whitish-ochreous. Palpi blackish, towards base whitish internally. Abdomen whitish. Forewings elongate, costa gently arched, apex obtuse, termen rounded, rather oblique; 3 and 4 stalked; whitish-ochreous, with a faint grey tinge; costal edge dark-fuscous towards base; a submarginal series of seven large black dots round apex and termen: cilia ochreous-whitish, with dark-fuscous subbasal and fuscous subapical line. Hindwings ochreous-whitish; cilia white.

Khasis, in April; one specimen.



*Epimactis turbida*, n. sp.

♀. 14-18 mm. Head whitish. Palpi white, second joint externally dark-fuscous on basal  $\frac{2}{3}$ . Thorax fuscous, shoulders whitish. Abdomen whitish-grey. Forewings elongate, costa slightly arched, apex tolerably pointed, termen sinuate, oblique; light fuscous; costal edge ochreous-whitish; dorsal area towards base suffused with rather dark purplish-fuscous; stigmata dark-fuscous, plical small, slightly beyond first discal, second discal rather large, connected with dorsum by dark-purplish-fuscous suffusion, terminal area beyond this more or less darker-suffused; some undefined cloudy-dark-fuscous spots round posterior part of costa and termen: cilia whitish-fuscous, with faint darker subbasal shade. Hindwings pale-grey or whitish-grey; cilia ochreous-grey-whitish.

Khasis, in September; three specimens.

*Epimactis spasmodes*, n. sp.

♀. 21 mm. Head whitish-ochreous; palpi ochreous-whitish, second joint externally fuscous, except towards apex, terminal joint anteriorly infuscated towards apex. Thorax fuscous. Forewings elongate, posteriorly somewhat dilated, costa gently arched, apex tolerably pointed, termen sinuate, oblique; whitish fuscous; costal edge whitish-ochreous; a suffused dark fuscous wedge-shaped spot along base of dorsum; stigmata dark-fuscous, plical, beyond first discal; a fuscous shade from  $\frac{2}{3}$  of costa to dorsum before tornus, angulated inwards to touch second discal; a strongly outwards-curved series of cloudy dark-fuscous dots from beneath costa at  $\frac{2}{3}$  to dorsum before tornus; a series of cloudy dark-fuscous dots round posterior part of costa and termen: cilia whitish-ochreous, slightly fuscous-tinged, with a basal series of dark fuscous dots on termen. Hindwings pale whitish grey-ochreous; cilia whitish-ochreous.

Palnis (Campbell); one specimen.

*Epimactis infulata*, n. sp.

♂. 14 mm. Head whitish. Palpi white, second joint externally dark-fuscous on basal  $\frac{2}{3}$ ; antennal ciliations 4. Thorax light fuscous, shoulders whitish. Abdomen grey. Forewings elongate, costa gently arched, apex round-pointed, termen rather sinuate, somewhat oblique; brownish-grey; costal edge white, costa towards base more broadly suffused with whitish; stigmata dark-fuscous, plical rather obliquely beyond first discal, second discal connected with dorsum by a direct dark-fuscous rather irregular streak; three blackish linear marks on posterior part of costa, and a black line round apex and termen: cilia white, beneath tornus light-brownish-grey, round apex with a light fuscous subbasal shade becoming faint, spots on termen. Hindwings light-grey; cilia whitish, with grey subbasal suffusion.

Kegalle, Ceylon (Alston); one specimen.

*Epimactis strombodes*, n. sp.

♂ 17 mm., ♀ 24 mm. Head, palpi and thorax whitish-yellow, second joint of palpi fuscous except towards apex. Antennal ciliations 4. Abdomen whitish-ochreous. Forewings moderate, costa rather strongly and evenly arched, apex rounded, termen rounded, little oblique; whitish-yellow: cilia whitish-yellow, round apex suffused with ochreous-orange, with tips dark-fuscous, the orange suffusion in ♀ extending over costal cilia on apical fourth of wing. Hindwings yellow-whitish; cilia whitish-yellow.

Kandy, Ceylon, in March and May (Mackwood, Green); two specimens.

*Antolaea*, n. g.

Head with dense appressed scales; ocelli absent; tongue developed. Antennæ  $\frac{3}{4}$ , in ♂ minutely ciliated, basal joint broadly dilated with dense scales. Labial palpi long, recurved, with appressed scales, second joint



somewhat roughened anteriorly towards apex, terminal joint as long as second, pointed. Maxillary palpi very short, filiform, appressed to tongue. Posterior tibiae with dense loose hair scales above. Forewings with discal tuft of scales; 1b furcate, 2 from towards angle, 3 and 4 stalked from angle, 7 and 8 stalked, 7 to costa just above apex, 11 from middle. Hindwings under 1, oblong-ovate, cilia nearly 1, 2 tolerable, 3 and 4 stalked, 5 nearly parallel, 6 and 7 stalked.

*Antolwa xanthopa*, n. sp.

♂ ♀. 13-14 mm. Head white. Palpi white, second joint tinged with yellowish. Thorax white, dorsally tinged with yellowish. Abdomen whitish. Forewings elongate, costa rather strongly arched, apex obtuse, termen nearly straight, somewhat oblique; white; a large undefined blotch of ochreous orange suffusion occupying lower part of disc posteriorly, with some scattered black specks within and above it, and including a tuft of scales mixed with black representing second discal stigma, and a small spot or group of black scales towards dorsum; a large black dot in disc towards termen, and a few black specks above and below this: cilia white. Hindwings and cilia white, faintly tinged with yellowish.

Khasis, in April; two specimens.

*Odites atmopa*, n. sp.

♀. 26-27 mm. Head, palpi, thorax, and abdomen pale whitish-ochreous; palpi slightly brownish-tinged towards base. Forewings elongate, costa moderately arched, apex obtuse, termen straight, nearly vertical, rounded beneath; whitish-ochreous; costal edge ochreous except towards base; discal stigmata minute, blackish, second immediately followed by a pale grey cloudy spot; a curved subterminal series of a very few grey scales; a terminal series of cloudy blackish-grey dots: cilia whitish-ochreous, on costa ochreous with tips dark fuscous just before apex. Hindwings and cilia yellow-whitish.

Kandy, Ceylon, in December (Green, Mackwood); two specimens. Allied to *paracyrta*.

*Odites actiosa*, n. sp.

♀. 18 mm. Head and thorax pale greyish-ochreous. Palpi ochreous-whitish, second joint suffused with dark fuscous. Abdomen grey. Forewings elongate, costa gently arched, apex obtuse, termen faintly sinuate, somewhat oblique; pale greyish-ochreous; a black dot on base of costa, and one at base in middle; stigmata black, plical elongate, somewhat beyond first discal; a series of black dots round termen: cilia whitish-ochreous. Hindwings light-grey; cilia ochreous-whitish, with light-grey subbasal shade.

N. Coorg, 3,500 feet, in February (Newcome). Resembles *sphendonistis*, but in that species the termen of forewings is not sinuate, the median black dot is not quite basal, the terminal dots not quite marginal, and continued round apical portion of costa.

*Odites euphema*, n. sp.

♀. 15-17 mm. Head and thorax light ochreous-yellowish. Palpi whitish-yellowish, second joint externally fuscous except apical third. Abdomen whitish-yellowish. Forewings elongate, rather narrow, costa gently arched, apex obtuse, termen rather obliquely rounded; ochreous-yellowish; second discal stigma moderate, round, dark-fuscous: cilia light-ochreous yellowish. Hindwings and cilia whitish-yellowish.

Mundgod and Pala, Kanara, in October (Maxwell); N. Coorg, 3,500 feet, in August (Newcome); three specimens.

*Odites pragmatias*, n. sp.

♀. 17-18 mm. Head white, palpi white, second joint externally dark-fuscous on lower  $\frac{2}{3}$ , terminal joint with extreme base dark fuscous, and



tinged with dark-fuscous towards apex. Thorax whitish, sometimes greyish-tinged. Abdomen ochreous-whitish. Forewings elongate, posteriorly slightly dilated, costa gently arched, apex pointed, termen sinuate, rather oblique; whitish, sometimes partially suffused with very pale greyish-ochreous, with irregularly scattered blackish scales; a blackish transverse mark on base of costa, and a short suffused blackish streak along base of dorsum; stigmata black, plical obliquely beyond first discal; a curved series of four large blackish dots in disc at  $\frac{2}{5}$ , and one on dorsum below second discal; a series of blackish dots round posterior part of costa and termen: cilia ochreous whitish. Hindwings with 3 and 4 long-stalked; pale greyish-ochreous; cilia ochreous-whitish.

Pykara, Nilgiris, 7,000 feet, in April (Andrewes); two specimens.

*Odites sphenidias*, n. sp.

♂. 16 mm. Head ochreous-white. Palpi whitish, lower half of second joint dark-fuscous, terminal joint with extreme base dark-fuscous, and somewhat suffused with dark-fuscous towards apex. Antennal ciliations 3. Thorax ochreous-whitish, posterior extremity blackish. Forewing elongate, costa gently arched, apex obtuse, termen slightly rounded, rather oblique; ochreous-whitish; a black dot on base of costa, one at base in middle, one towards costa at  $\frac{1}{4}$ , and one beneath fold below this; stigmata black, first discal large, subtriangular plical obliquely beyond first discal; a small triangular blackish spot on middle of costa; a strongly curved series of rather large cloudy blackish dots from  $\frac{2}{3}$  of costa to dorsum before termen, interrupted towards dorsum; a series of blackish dots round posterior part of costa and termen, two on costa about  $\frac{2}{3}$  enlarged and suffused beneath with fuscous: cilia ochreous-whitish. Hindwings and cilia ochreous-whitish.

Khasis, in October; one specimen.



## REVIEWS,

## LEPIDOPTERA INDICA.

Entomologists in India will be glad to hear that *Lepidoptera Indica* has now been completed. The work was commenced in 1890 by Dr. F. Moore and dedicated by him to Queen Victoria. In 1907 Moore died before he had completed the work, a fatality that befell the authors of the only other books on Indian butterflies, thereby seriously interfering with our prospects of obtaining a complete account of the butterflies of India. However, an able successor to Dr. Moore was found in Col. C. Swinhoe and he is to be heartily congratulated on having completed the work.

The book has been published in 123 parts, to be arranged in ten volumes; there are 835 coloured plates. Two hundred and fifty copies have been printed and the price complete is £85. The publishers, Messrs. L. Reeve & Co., announce that they are prepared to supply the work on the deferred payment system and to furnish sets with uncoloured plates or of the letterpress only.

The book contains a full list of references, and a detailed description of every family, genus and species: also, when known, an account of the earlier stages and of the habits generally. There is a coloured figure of the male, female and underside of every species, and in many cases of the larva and pupa, and of the various seasonal forms. In the latter parts drawings of the genitalia, head, etc., have been given. The book can, in fact, be said to be as complete as it was possible for the authors to make it.

The first attempt to produce a connected account of Indian butterflies was made by De Nicèville, though Moore had some years previously written a magnificent work in three volumes on the butterflies of Ceylon. In his *Lepidoptera Indica*, Moore followed generally the arrangement adopted by De Nicèville, but he divided up many of the more important genera into numbers of new genera based on slight differences in the venation or in the secondary sexual characters. In addition to this, he divided up the six families into 48 sub-families, one of which, the Nymphalinae, was further subdivided into 8 groups. This system is, perhaps, scientifically correct; it is certainly not popular with the collector and it remains to be seen whether it will survive. As to species, Moore and Col. Swinhoe belonged to what may perhaps be called the old school of entomologists who separated any apparently constantly differing form as a species, and many of us will, no doubt, remember the somewhat heated controversies that raged between Watson and De Nicèville on the one hand and Moore, Butler and Col. Swinhoe on the other. The modern school, of which the Tring Museum and the German entomologists are the exponents, have struck a happy mean in the "race" system, thus reviving in another form many of Moore's species, that Watson and De Nicèville and later Bingham would have nothing to do with. That Moore was an extremely careful and conscientious observer is undoubted, there is none of the carelessness in his work that one comes across so often in Bingham's volume on butterflies in the *Fauna of India* series. It is only just to Col. Swinhoe to state that he has fully maintained the standard set by Moore, though, perhaps, not always so accurate. He is, however, a member of the same school and his treatment of some of our well known species was somewhat alarming; for instance the *hecabe* group of the genus *Terias*, where 26 "species" are given for what have generally been considered to represent at most 3 or 4 really distinct species. In the descriptions of the genera and species a detailed account is given of each feature, a system that is excellent as



far as it goes, but one cannot help thinking how useful it would have been, if we had been briefly told exactly how two closely allied species differed from one another; as an instance *Parnara flexilis* and *colaca* may be quoted.

The plates, as already indicated, are most complete, but here again the times have changed, and one has only to look at Seitz's work on the Butterflies of the world to see the difference. In the plates in *Lepidoptera Indica* the uppersides of both sexes are portrayed in full, while the underside of one-half only is given; the figures are arranged far apart so that only 3 or 4 species are to be found on one plate; no names are given and the plate index has to be consulted in order to ascertain the name of any particular insect figured. In Seitz's plates some fifty figures are crowded on to one plate; only half the upperside and half the underside are figured; females are not figured when they differ but little from the male; and, what is most important, the name is given under each figure. The plates of *Lepidoptera Indica* are hand coloured and in most cases, especially towards the end of the book, the work has been well done; this cannot, however, be said of some of the plates towards the middle of the book.

We may now call a stop to criticism and conclude by saying that *Lepidoptera Indica* is a book that will stand for very many years as the most important and complete work of reference on Indian Butterflies. Alas! that only a few of us will be able to afford the luxury of a copy; it will, however, be certain to find a place in every Museum and thus be accessible to us all.

W. H. E.

#### "INDIAN PIGEONS AND DOVES"

BY

E. C. STUART BAKER, F.Z.S., F.L.S., M.B.O.U.

The Indian Pigeons were not included by Hume in his *Game Birds of India*, (Witherby & Co.), although quite as much "Game Birds" in the wide sense of the word as many of the birds given by him, and no illustrated work has ever been published on these interesting birds. In the fourth Volume of the "Birds" in the "Fauna of British India" Series, Blanford gives an excellent account of all the different kinds of Pigeons and Doves; but as that work is in four Volumes and each species is treated as briefly as possible, it is not in the hands of many sportsmen and bird-lovers and therefore Mr. Stuart Baker's Volume should be all the more welcome. The ornithologist too will find the book most useful as it brings up to date and amplifies Blanford's work.

Under each species full descriptions of plumage, including in many cases young in down, which were not given by Blanford, distribution, nidification and vernacular names are given in small type under heavy type headings, and notes on habits and shooting in large type, so that any information required can be easily found.

There has unfortunately been some changing of generic and specific names, the latter necessitated by the recognition of subspecies; but the reasons for these have been clearly shown by Mr. Stuart Baker, and since the sportsman and bird-lover, as a rule, confine themselves to English names, the changes should not cause any confusion.

In his introduction the author makes clear his position as regards subspecies or geographical races; and we think that, after a careful study of his book, most Indian Ornithologists will agree with his views.

The total number of true species recognised by Blanford was forty-five, while Mr. Stuart Baker gives an account of fifty-one species and subspecies. This difference is made up by the addition of two subspecies



recently described and by four of Blanford's species being divided into two subspecies each. It may also be remarked that thirteen of Blanford's full species have only been given subspecific rank by Mr. Stuart Baker.

The principal stronghold of the different kinds of green pigeons being in Assam, where Mr. Stuart Baker was long stationed, he is able to give us some excellent personal observations on habits and interesting accounts of the sport he has had amongst these birds. In regard to the latter he has been fortunate enough to take part in some big shoots at two of which over four hundred birds were obtained by several guns on one day shooting in the morning and evening. At these shoots it is interesting to note that two-thirds of the birds shot were Ashy-headed green pigeons, while the remainder included no less than ten other kinds of pigeons and doves shot by mistake. Though not generally shot, many of the doves, as pointed out by the author, give quite good shooting, and are not by any means to be despised as an addition to the pot when game is scarce.

As illustrating the tameness at times of some doves, Mr. Stuart Baker gives an account of how a pair of Spotted Doves (*Streptopelia suratensis*), which nested in the verandah of his bungalow, used to descend on to a table to pick up vegetable scraps.

The Little Brown Dove, too, is a confiding bird, and often breeds in verandahs and even inside bungalows, an instance being given of a pair breeding in a dining room between a picture and the wall.

Of some species there is still a good deal to be learned in regard to different plumages, distribution and as to what parts of the country they are resident and migratory in; and it is to be hoped that members who are in a position to add to our knowledge in anyway will do so and send in notes to our Journal. The addition of a few avicultural notes at the end of the accounts of each species will, no doubt, be an incentive to many who have the facilities and inclination to keep pigeons or doves as pets.

There are twenty-seven coloured plates chiefly by H. Gronvold, but a few by G. E. Lodge. As regards the illustration, the colours are beautiful, but we cannot help feeling that the method of reproducing them has in some cases made the appearance of the bird a little flat. We do not think the artist can have drawn such a flat-breasted bird as that given on plate 3. In spite of these remarks, however, the plates, as a whole, are excellent, and should be of the greatest assistance in identifying the different species.

The book is bound as a companion Volume to "Indian Ducks and their Allies," and has one great advantage over that work, and that is that it is much lighter to handle.

We can strongly recommend "Indian Pigeons and Doves" to all members interested in birds, and Mr. Stuart Baker is to be congratulated on producing such an excellent book. A word of praise too is due to Messrs. Witherby & Co. for the general get-up and printing of the Volume.

N. B. K.



## PROGRESS OF THE MAMMAL SURVEY OF INDIA, BURMA AND CEYLON.

There is not very much progress to report since the last Journal was published in December 1913.

Mr. Crump has been collecting in Kumaon at Ramnagar to the West of Almora and then moved to Naini Tal. As it was desirable for a camp to be made a little nearer the N.-W. border of Nepal he then went to Lohaghat and thence to Philibit. He has now left Kumaon for Palamau and Hazaribagh in the province of Behar and Orissa. Mr. Oldfield Thomas writes from the British Museum that the Kumaon Collection is most interesting since it contains many animals illustrating Hodgson's Nepal work.

Mr. Shortridge arrived at Victoria Point, Lower Tenasserim, in December and has been steadily collecting in that neighbourhood and on the Pakchan River since then. As there are more than 800 Islands in the Mergui Archipelago it was decided to work the mainland first and to leave the Islands till another dry season. He is now leaving the extreme South for Mergui. As was anticipated the specimens obtained from Lower Tenasserim are of much interest and contain a large number of specimens similar to those collected by Anderson in this locality some fifty years ago.

Major Mayor is still collecting in Ceylon and is now at Kandy and is working the higher parts of the Island.

As regards finance many members have kindly sent in donations since the last Journal was issued as will be seen from the list of subscriptions received given below.

The Government of Bombay have kindly promised a further donation of Rs. 10,000 towards the expenses of the Survey in addition to the Rs. 2,500 contributed by them in 1912.

The Trustees of the British Museum have also promised a further donation of £100.

The thanks of the Society are due to the following railways who have kindly promised to carry our Collectors and their assistants with free luggage over their systems whilst working in connection with the Survey :—

Ceylon Railways.	Bombay, Baroda and Central
Oudh and Rohilkund Railway.	India Railway.
North Western Railway.	Burma Railways.
Eastern Bengal Railway.	East Indian Railway.
Assam Railways and Trading	Great Indian Peninsula Railway.
Company.	Madras and Southern Mahratta
Assam-Bengal Railway.	Railway.
Bengal and North Western	Rohilkund and Kumaon Railway.
Railway.	South Indian Railway.
Bengal-Nagpur Railway.	

The British India Steam Navigation Company have also generously agreed to bring over from Burma and Ceylon boxes of



specimens free of charge, and the acknowledgments of the Society are due to all these Companies who are so generously contributing to what is evidently felt to be an important advance to the scientific knowledge of the fauna of the Indian Empire and Ceylon.

### MAMMAL FUND.

FURTHER LIST OF SUBSCRIPTIONS UP TO 3RD MARCH 1914.

NAMES.	Amount.		
	Rs.	a.	p.
Amount previously acknowledged in Journal No. 3, Vol. XXII .. .. .	56,630	9	2
Acworth, E. C. B. .. .. .	50	0	0
Alston, G. C. (2nd Donation) .. .. .	15	0	0
Archibald, W. .. .. .	15	0	0
Bailey, Capt. F. M. .. .. .	15	0	0
Bannerman, Surgeon-General W. B., C.S.I., I.M.S. (2nd Donation) .. .. .	50	0	0
Boyle, D.H.M. .. .. .	14	4	0
Budd, Lt.-Col. N.A.H. (3rd Donation) .. .. .	75	0	0
Capper, Brig.-General W. .. .. .	15	0	0
Carl, Gross .. .. .	9	8	0
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Culbertson, T. M. S. (3rd Donation) .. .. .	10	0	0
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Evans, Col. G. H., C.I.E. (2nd Donation) .. .. .	15	0	0
Fenton, Col. L. L. (2nd Donation) .. .. .	15	0	0
Field, F. . . . .	15	0	0
Forsyth, Dr. Wm. (4th Donation) .. .. .	1	12	0
Gervers, Major F. R. S. .. .. .	15	0	0
Gladstone, H. S. .. .. .	16	1	0
Goll, E. A. .. .. .	35	0	0
Government of Bombay (2nd Donation) .. .. .	10,000	0	0
Government of Central Provinces .. .. .	2,500	0	0
Government of Federated Malay States (1,000 Dollars) .. .. .	1,750	0	0
Hardy, G. S., I.C.S. (2nd Donation) .. .. .	50	0	0
Heath, R. H., C.E. (3rd Donation) .. .. .	10	0	0
Hichens, G. W. . . . .	25	0	0
Hill, Hon'ble Mr. Claude H., C.I.E., C.S.I., I.C.S. .. .. .	15	0	0
Hingston, Capt. R. W. G., I.M.S. .. .. .	15	0	0
Jennings, Lt.-Col. W. E., I.M.S. .. .. .	15	0	0
Julius, V. A. (2nd Donation) .. .. .	15	0	0



## PROGRESS OF THE MAMMAL SURVEY.

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NAMES.	Amount.		
	Rs.	a.	p.
Junagadh, The Minor Nawab Saheb.. .. .	2,500	0	0
Langford, Capt. E. G. . . . .	5	0	0
LeMesurier, H. P. . . . .	15	0	0
Macnaghten, H. P. W. (2nd Donation) . . . .	50	0	0
Macphail, G. . . . .	8	5	0
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Marshall, Dr. H. H. . . . .	10	0	0
Millard, W. S. (4th Donation) . . . . .	200	0	0
Millett, G. P. (2nd Donation).. . . .	15	0	0
Mysore, H. H. The Maharaja (2nd Donation) . .	1,000	0	0
Oliver, A. (3rd Donation) . . . . .	15	0	0
Procter, Hon'ble Sir H. E. E. . . . .	100	0	0
Purkis, F. C. (3rd Donation) . . . . .	15	0	0
Sale, E. L. I.C.S., (3rd Donation) . . . . .	25	0	0
Scott, Capt. F. B. (2nd Donation) . . . . .	15	0	0
Shepherd, T. F. G. . . . .	15	0	0
Sinclair, R. L. . . . .	5	0	0
Sladen, J. I.C.S., (2nd Donation) . . . . .	15	0	0
Smith, J. H. . . . .	10	0	0
Sprott, F. H. . . . .	10	0	0
Suter, Dr. M. F. . . . .	50	0	0
Tweedie, A. G. (4th Donation) . . . . .	10	0	0
Tyrrell, Major J. R., I.M.S., (2nd Donation) . .	15	0	0
Villar, A. R. . . . .	15	0	0
Wall, Major F., I.M.S., (2nd Donation) . . . .	30	0	0
Waterfield, E.H., I.C.S., . . . . .	15	0	0
Watson, Major J. W., I.M.S., . . . . .	14	10	0
Webb, J. E. . . . .	15	0	0
Webb, M., I.C.S., . . . . .	15	0	0
Whately, R. (2nd Donation) . . . . .	15	0	0
Wickham, P. F. (2nd Donation) . . . . .	25	0	0
Williams, E. Alban . . . . .	5	0	0
	76,760	5	2
PROMISED.			
Mr. Ratan Tata, 2nd Donation . . . . .	Rs. a. p.		
Government of Federated Malay States	1,000-0-0		
(2nd Donation).. . . .	1,750-0-0		
	2,750	0	0
Interest previously received from the			
Bank . . . . .	1,192-6-1		
Interest paid by the Bank on Fixed			
Deposits, etc., up to the end of 28th			
February 1914 . . . . .	224-7-10		
	1,416	13	11
TOTAL RS.	80,927	3	1



## MISCELLANEOUS NOTES.

No. I.—NOTES ON WROUGHTON'S FREE-TAILED BAT  
(*OTOMOPS WROUGHTONI*).

These bats were found at Talewadi in the Belgaum District, some 20 miles North of Castle Rock. They occupied a large cave which is locally known as the Bara Pêde (12 caves) and is reported as being a favourite haunt of bears. The entrance is completely screened by vegetation, the interior is very roomy and the sides and upper surface are scarred with deep hollows and ridges. The cave contained 2 different kinds of bats, *Megaderma spasma* and the present species. The Vampires seemed to favour the innermost portion of the cave, where it was extremely dark, while the *Otomops* sought shelter in the hollows about the entrance. Deep within these holes both males and females cluster in masses and single shot fired into one of these hollows secured some 30 specimens. As a rule, they hang by their hind feet, head downwards, but I saw two specimens clinging flat against the surface of the roof, using the claw at the end of the wing for support. Last December, Mr. J. B. Anding, who secured several specimens for the Society, found a female with a young one clinging one in front of it. Out of the same lot we secured 3 or 4 fetal specimens, but never more than one from each bat. These bats utter a very sharp cry when alarmed, which they prolong for some time. The year I was fortunate enough to obtain a specimen alive. It lived in captivity for about 6 days, and used to spend the greater part of its time hanging by the legs from a 'game carrier' which was suspended on the wall, though occasionally it climbed up and lay flat on it. From what I observed this species seemed to prefer a fruit diet and invariably spat out any flies I offered him: at first he would not eat by itself, but showed no reluctance in swallowing pieces of banana put into its mouth, latterly it fed itself and while in the museum ate a couple of figs that were put into the cage.

S. H. PRATER.

BOMBAY NATURAL HISTORY SOCIETY'S MUSEUM,  
20th October 1913.No. II.—POSSIBLE OCCURRENCE OF A BLACK TIGER  
(*FELIS TIGRIS*).

I say possible, as the animal was not bagged. My son, who has shot several tigers and who knows what a black leopard is, writes as follows:—  
"Have you ever heard of such a thing as a black tiger, not leopard? While up the Kaikkwe in the Bharno District, I went out to the 'Lwins' (open grassy spaces in the forest) for Tsine, but on returning about 10 a.m. near the edge of a Lwin we heard a grunting at intervals of about 10 or 15 seconds. I insisted that it was a pig wallowing, but my shikari said he thought it was a Tsine about to calve. We followed up the sound and then hearing a deep guttural grunt, we knew it was a tiger. I told the shikari I was off home and put up my hand to show him a road out of the Lwin when from about 10 yards in front of us a big black mass made two bounds and was away. I let off my .577 at it at about 15 yards range, and I think, hit it in the stomach. The animal being quite black I turned to the shikari and told him it was a pig, while he insisted it was a bear, but on tracking up we found enormous pug marks (they measured 1'-8" round). After the shot it went on for some 5 or 6 yards, stopped



for a moment, and then went on another 100 yards and started growling again. We then left and returned next day, but could not find it. It was evidently hit, as it had torn up a lot of undergrowth and small bushes."

It is a great pity that the animal was not obtained, as even if the remains are found later on, there will probably be no traces of its having been black.

T. A. HAUXWELL,  
Conservator of Forests.

MAYMYO, BURMA, 1st October 1913.

[Dr. Blanford in the "Fauna" mentions a black tiger which Mr. C. S. Buckland reported to him as having been shot near Chittagong.—Eds.]

### No. III.—MONGOOSE V. COBRA.

In the last Journal, mention is made of a fight between the above. This reminds me of an incident which I witnessed while riding from Sirohi to Anadra one day. My attention was drawn by some brown thing moving in a small *Cassia auriculata* bush. It proved to be a mongoose, *Mungos mungo*, attacking a cobra, *Naia tripudans*. The cobra (fairly young, some 4 feet I should say) was lying in waves over the twigs, the mongoose was leaping up at it from below, the cobra making such plunges at him as his unstrategical position allowed. A forlorn babbler was hopping dismally about on the twigs all the time; so probably the cobra had been paying attentions to the babbler when the mongoose's arrival drove him up to higher ground. I brought my horse's head close to the bush, but neither combatant seemed to notice us. After perhaps half a minute of upward jumps of the mongoose at the snake's body and as many counters by the snake, the mongoose ran off into the long grass 10 yards off. The snake lowered his hood and slid downwards off the bush into the low grass, moving off in a line at right angles to that taken by the mongoose. He had not gone far when the long grass stirred, and the mongoose peeped out. The snake stopped and raised its head, suspecting danger, but did not expand its hood. For a second or two they remained thus, when in a second the mongoose had sprung forwards, nipped the snake's head and dragged him off, back downwards, into the long grass.

J. H. SMITH.

BHUJ, Cutch, January 10th, 1914.

### No. IV.—FEMALE ELEPHANT GIVING BIRTH TO THREE YOUNG.

We think that the following may be of interest to you. On the 27th October 1913 one of our working female elephants gave birth to triplet calves, all males.

We have no note of the date of impregnation, but the mother was heavy in calf in October 1912 and was said to be due in one to two months. Of the calves, one was still-born, one was normal and one was very small; the two latter only survived until 8th and 9th November.



Everything was done to bring them up but the mother would not look after them and kicked them away when they came to suckle, or if let loose would run away from them.

The mother's height is 7 feet 4 inches, she is probably about 25 years old and has never to our knowledge had calves before.

D. F. MACFIE, MANAGER,  
The Borneo Coy., Ltd.

CHIENG-MÁI, SIAM, 20th December 1913.

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No. V.—RED SEROW IN UPPER CHINDWIN.

I shot last April in the Upper Chindwin District of Burma a full-grown male Serow with 8 inch horns. I made a fairly careful description of it at the time, which I find answers to Mr. Pocock's description of *Capricornis sumatraensis*, subspecies *rubidus*, in his article on the Serows, Gorals and Takins of British India. This subspecies, however, he only mentions as being found in (Burma) in Arakan and Salween. As it is also found in Assam, I should think it likely that it may be found here and in the Chin Hills as well.

J. M. D. MACKENZIE.

KINDAT, BURMA, 8th December 1913.

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No. VI.—LARGE MARKHOR FROM BALTISTAN.



I am sending you a photograph of a good (though one-horned) Markhor which I got this year, as I thought it might be interesting enough to insert



## MISCELLANEOUS NOTES.

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among the "Miscellaneous Notes" of the Journal. The details of measurements, etc., I give below:—

	Over curve.	Circumference.	Straight.
<i>Left horn</i>	53"	10 $\frac{1}{2}$ "	33 $\frac{1}{2}$ "
<i>Right horn.</i>	18"	11"	..

Shot, 25th May 1913, below Rondu (Baltistan).

W. M. LOGAN HOME, Capt.,  
112th Infantry.

Nowshera, N. W. F. P., 8th December 1913.

[To this note Capt. Logan Home added in a later letter (10th January 1914), that he had been informed by the Secretary of the Game Preservation Department, Kashmir, that the unbroken horn was the record head for Baltistan proper.—Eds.]

## No. VII.—HOW WILD BOARS FIGHT.

In the September number of the Journal of our Society I see an interesting note about the wild boars and how they fight. I have several times seen fights.

Once, in Algeria, many years ago, I was waiting for a panther in a clearance of very thick jungle. It was sandy ground at this place and the opening, under a bright moonlight, was nearly as clear as daylight. I was sitting on the ground, screened by some branches, with my feet in a little gully cut by running water at the very edge of the clear space, which might have been, say, twenty yards broad by thirty or forty.

At about eleven, I heard, all at once, a sudden row in the jungle close by and some grunts of wild boars. My first idea was that the panther was just attacking a boar. But as it lasted for some while, I saw, I was mistaken, but was at a loss to account for the noise. Presently a rush in the jungle to my right and the swaying of some branches quite close to me, with more grunts, made me feel that my shelter would have been more comfortable if stronger. I then saw a large boar backing out in the clear space suddenly stop and charge full speed into the thicket out of which he had come out. Then more grunts and row in the wood. This was very puzzling, but after a short time and a dead silence, a large boar walked out in the open space just in front of me and stood motionless, head low and hair standing on end on the back. Almost directly another, about the same size, came out trotting and the first one charged at him as straight as a cannon ball. They kept fighting by turns for certainly a quarter of an hour sometimes quite near my hiding place and sometimes in the jungle. I did not care to shoot them on account of my panther which I was afraid would be scared away. These two boars were grand chaps: fully two hundred and fifty pounds weight, each of them seemed exactly the same size and I had a good look at them.

Evidently, when boars fight, they go at each other full tilt, head rather high, and they nearly always both rear up like horses on their hind legs when coming into contact, both chins touching and trying to get at the other for a broadside swing. Then they stop and stand motionless a few yards apart for a rest. At this time they never utter a sound. The grunting takes place only when they touch each other. After a short rest one can see the fringe of hair on the back bristling and the boars munching a few times; then they appear to stiffen  
 11 their body and raise themselves on tip toe, the fore legs seem to  
 a ve at this time a sort of quivering motion and as soon as one of



them is doing this the other goes through the same performance and both charge together as hard as they can. The grunting takes place at this time of the real hard tussle. It seems that as long as both heads are held high enough and that neither of the fighters gives a broadside or flank chance at the other, very little damage will occur. Once, one of them got his snout under the chest of the other and lifted it with incredible speed, the other gave him repeated cuts on the top of the shoulder and made him back a little then had a chance at the side and went at him with all his power, both very nearly rolled over, but, after a short contest—difficult to see in the dust—both brutes were looking at each other about a yard apart munching rapidly but none the worse. As far as I could see they never try a direct vertical toss, but always a slanting upwards broadside cut. The shape of the tusks and their position makes this last cut the only effective one. I carefully observe the cuts on boars when I kill any, and the scars are always the same; some may be seen at the end of the lower jaw near the neck, but much oftener on the shoulder and ribs. I never saw but one further back than the flanks. These cuts are rarely more than four or five inches long and generally only two. It is common to see old boars with a few healed scars about, and, I believe, that they fight very often if two of them of about the same size are discussing family questions; but a small one will never stand the charge of a bigger one and to drive him away the big one has only to rise on tip toes with the quivering motion of the legs announcing the charge. Sometimes a big chap feeding will make a short charge at a little one who never waits for him but runs away a short distance at once.

It is easy to see that the big one does not mean more than that, because his charge is not made with a will, and, being heavier, even if he wanted to catch the other, he could not manage it. When turning sharp it seems to me that they fix firmly their fore legs on the ground and swing the hind quarters round. Given the weight of the shoulders it is very logical, because the heavy part of the body acts as a pivot for the lighter part. But all these moves are well known to pigsticking people, who do not ignore that a boar at full gallop can turn sharp on its fore legs and jump or rear right up to the level of the saddle.

I did not see the end of the fight described above, because it was finally carried on in the jungle; but I was very much astonished on the morrow to find hardly a drop of blood on the ground. Animals are proportioned to their natural means of attack and do not injure each other half as much as we believe. Even a rhinoceros can dig at another with all its power without making much impression on him. It is necessary that it should be so. If wild boars, rhinoceroses and the like could injure each other, as they can do animals of different species there would not be many left.

Another time, in Assam, I saw two boars fighting. It was early morning in a burnt place and not far from my camp. It was about two hundred yards away and did not last more than a minute in sight of me. As far as I could see it was the exact repetition of my Algerian experience.

Again in the Caucasus I saw two large boars fighting. It was in the dim light of sunset and about eighty yards from us. They came out of the forest at full gallop, one chasing the other which was dodging like a hare and all at once wheeled on his fore legs to wait for him. Then both reared against each other grunting and began just the same sort of thing which I had seen in Algeria.

In Somaliland I got a glimpse of Wart Hogs fighting, but too far to see them properly. The grass being about two feet high at this place, all I could see was from time to time the two Wart Hogs rearing and even jumping high up against each other, but when they were on the ground,



they were out of sight. I dare say they fight pretty well, the same way as the common wild boar.

If large wild boars are fighting and anybody disturbs them, the chances are for a charge at the intruder. In my opinion, it is very likely that both would make straight for the man if he came unexpected quite close to the battle, but if over, say, fifty yards away he will hardly be noticed and if he shows himself and shouts, the Boars will stand motionless for a while and then, as soon as one of them goes away, the other will charge at him and both will go away together wheeling and fighting the while. I never saw or heard any reliable evidence of wild Boars killing each other in a fight. I wonder if it is possible, given the length of the tusks and the thickness of skin and flesh and muscles on the exposed parts. No doubt, they can rip open a pony, but what is the skin of a horse to compare with that of a Boar?

VICOMTE EDMOND DE PONCINS.

FEURS, LOIRE, FRANCE, December 1913.

#### No. VIII.—NOTES ON THE WEIGHTS OF ANIMALS.

The following is a list of weights of a number of "chiefly small" Indian mammals. In some instances it has been possible to weigh a series of each species and so arrive at an average weight; in others marked \* only one or two specimens were weighed.

It may perhaps be noticed that an animal's weight is often deceptive, the large Indian Civet and the Mongooses being heavier than would be expected in comparison with the Cats and Paradoxures. The Large Bamboo Rat is heavier than an average Cat; while the weight of a Jackal is hardly more than that of an English Fox. "*The Field*" Feb. 8th, 1913, recording a Dog Fox from Dorset weighing 21 lbs. Blanford records the weight of an Indian Fox (*Vulpes bengalensis*) as being only from 7-8 lbs.

*Hylobates hoolock* (the White-browed Gibbon), one male weighed 14½ lbs. and two females, 13½ lbs., respectively.

*Presbytis entellus anchises* (the Southern Langur).

Monkeys even when adult are very variable in size and weight, though, as a rule, the males are larger than the females. This species was found to be heavier than any other species of Indian Monkey yet weighed, averaging from 15-30 lbs., the heaviest male weighing 35 lbs., and the heaviest female 27 lbs.

*Presbytis johni*\* (the Nilgiri Langur) an adult male 21 lbs.

*Presbytis phayrei* (Phayre's Leaf Monkey), 17½-20 lbs.

*Simia sinica* (the Bonnet Monkey), 8-19½ lbs.

*Simia rhesus* (the Bengal Monkey, from N. Shan States), 12-15½ lbs.; the difference in the size of the sexes was not very noticeable in this species.

*Loris lydekkerianus* (the Madras Slender Loris) 9½-12½ ozs. The weight of these animals was very deceptive, they were not half the weight of an average bandicoot.

*Felis tigris*\* (the tiger), weight of a male, 9 feet 1 inch between pegs, from North Kanara, 350 lbs.

*Felis affinis*\* (the Jungle Cat), weight of a large male, 13 lbs.

*Felis bengalensis*\* (the Leopard Cat), an averaged sized specimen, 6½ lbs.

*Paradoxurus niger* (the Indian Toddy Cat) from 5½-8 lbs.

*Paradoxurus jerdoni* (the Brown Toddy Cat), 5½-9½ lbs.

*Paradoxurus hermaphroditus* (the Malayan Palm Civet), 6½-7½ lbs.

*Viverra zibetha* (the large Indian Civet), three specimens 18½, 19½ and 20 lbs. respectively, Blanford records specimens weighing 25 lbs.



*Fiverricula malaccensis* (the Small Civet),  $5\frac{1}{2}$ - $7\frac{1}{2}$  lbs.

*Mungos mungo* (the Common Mongoose), 3-4 lbs.

*Mungos vitticollis* (the stripe-necked Mongoose),  $6$ - $7\frac{1}{2}$  lbs.

*Mungos fuscus* (the Nilgiri Mongoose),  $3\frac{1}{2}$ -6 lbs.

*Mustela flavigula*\* (the Indian Marten),  $4\frac{1}{2}$  lbs.

*Canis indicus* (the Jackal), specimens average from 13-18 lbs., the two heaviest weighing 19 and  $19\frac{1}{2}$  lbs. respectively. Blanford records 20 lbs.

*Lutra lutra* (the Common Indian Otter), 10-11 lbs., exceptionally large specimens will probably be found to weigh more than this: Blanford records specimens weighing 20 lbs. and more.

*Aonyx cinerea*\* (the Clawless Otter), an adult male,  $9\frac{1}{2}$  lbs.

*Muntiacus vaginalis* (the Indian Barking Deer), two females weighed 41 and 60 lbs. respectively, while a large male weighed over 75 lbs.; this is considerably over the estimate given by Blanford, who records the weight of a male as only 38 lbs.

*Tragulus meminna* (the Indian Mouse Deer), average weight from 8-10 lbs.; these are also considerably more than the weight given by Blanford, who gives the average weight at between 5 and 6 lbs.; the males and the females weighed about the same.

*Pteropus giganteus* (the Indian Flying Fox),  $2$ - $3\frac{1}{2}$  lbs.

*Lepus nigricollis* (the South Indian Hare),  $4\frac{1}{2}$ -6 lbs., an exceptionally heavy male from Coorg, 8 lbs.

*Hystrix leucura*\* (the Indian Porcupine),  $21\frac{1}{2}$  lbs. (not an exceptionally large specimen).

*Petaurista philippensis* (the Flying Squirrel),  $4\frac{1}{2}$ -5 lbs.

*Ratufa indica* (the Giant Squirrel),  $3\frac{1}{2}$ - $5\frac{1}{2}$  lbs.

*Bandicota malabarica* (the Bandicoot  $2$ - $2\frac{1}{2}$  lbs.), a particularly large specimen weighing  $11\frac{1}{2}$  lbs.

*Epimys rufescens* (the Indian Mouse Rat),  $3$ - $5\frac{1}{2}$  ozs.

G. C. SHORTRIDGE.

c/o NATIONAL BANK, RANGOON,  
December 1913.

#### NO. IX.—CRESTED BLACK TIT IN THE PLAINS.

Among a party of Indian Grey Tits disporting themselves in the trees in my compound on 22nd December 1913, I noticed 4 or 5 Crested Black Tits *Lophophanes melanolophus*. In the "Birds of Kohat and Kurram" Whitehead, the Crested Black Tit, was noted as having been found on the Safed Koh from 6,500 to tree limit. Its descent to the plains has not, as far as I know, yet been recorded, and Kohat is in the plains and 50 miles or more from forest-clad hills, the natural habitats of *L. melanolophus*. The weather was cold at the time and there was snow on the hills towards Tirah.

H. A. F. MAGRATH, LT.-COL.

KOHAT, 2nd January 1914.

#### NO. X.—SYLVIPARUS MODESTUS, THE YELLOW-BROWED TIT, IN SEHORE. A CORRECTION.

In my notes on the Birds of Sehore, C. I., Volume XXI, p. 169, for *Sylviparus modestus* read *Cephalopyrus flammiceps* the firecap. The skin of the above was originally verified in the British Museum as *S. modestus*. It has since been found to be *C. flammiceps*.

KOHAT, January 1914.

C. H. T. WHITEHEAD, CAPT.



No. XI.—THE GREY-HEADED FLYCATCHER (*CULICICAPA*  
*CEYLONENSIS*, SWAINS).

On 29th December last, in the District Board Garden at Gujranwala, my notice was attracted by the loud notes of a small bird in a thicket of young trees. Investigation shewed it to be a Grey-headed Flycatcher: the next evening I saw it hawking insects from a neighbouring tree; and securing it, found it to be an adult female. It is sufficiently rare in these parts to be worthy of record.

Jhelum, Punjab.

HUGH WHISTLER, M.B.O.U.

No. XII.—ROCK THRUSH (*MONTICOLA SAXATILIS*,  
LINN) IN HAZARA.

This species occurs in Gilgit on the autumn migration, and it has been also recorded lately from Kohat and Lahore in September, yet we have otherwise but little information about the species as an Indian bird. Hence it is worth recording that I secured a female on September 29th between 8,000 and 9,000 ft., on Miranjani Hill, Hazara. This bird was perching on the tops of the one or two trees that grew on the bare hillside, and first attracted attention by the chestnut tail which was spread in flight.

HUGH WHISTLER.

JHELUM, PUNJAB, 20th October 1913.

No. XIII.—OCCURRENCE OF THE WHITE-BROWED BUSH-ROBIN  
(*IANTHIA INDICA*, VIEILL) IN THE NORTH-WEST  
HIMALAYAS.

Owing to the indefatigable efforts of my friend, Alec. Jones, I have much pleasure in recording the occurrence of the rare *Ianthia indica* in the N. W. Himalayas. This find is, in my opinion, by far the best of the season, in the Ornithological line, from these parts.

Towards the latter end of July last, Jones sent me for inspection the skin of a bird, shot on the 5th July, which he said he took for *Ianthia indica*. On examining it, I had no hesitation in referring it to this species, but in view of Oates' remarks (F. B. I. Aves, Vol. 11, p. 107), about the habitat of this bird, I thought it best to consult Mr. Kinnear, M. B. O. U., about the specimen, and he states in *epist*: "I must congratulate you on obtaining this Bush-Robin, which, I think, is without doubt *Ianthia indica*. It is a great find, being so far west of all previous records. I can find no notice of this bird's occurrence west of Nepal."

Jones has very kindly sent me the following very interesting notes from his diary in regard to the habits of this little known species:—

"During my stay in the N. W. Himalayas, I have come across *Ianthia indica* near Dalhousie, and in the Native State of Mandi, between elevations of 7,000 and 8,000 feet. This bird is the prince of skulkers, hiding continuously in dense undergrowth, and hence probably the reason of its having been overlooked here. Up to date, I have only *seen* this one bird, but have *heard* several singing in suitable spots along a three mile stretch of road, which I traversed in the Mandi State. Its song is very characteristic, and could not, I think, be mistaken for that of any other bird. It might be syllabalized as "I'll fleece you." The first note, low and prolonged, and gradually ascending the scale, and the remaining notes being finished off with a quick flourish. Occasionally two or three



deep liquid notes are added. I tried very hard to obtain further specimens, but after fruitless efforts had to content myself with only one. Possibly other Ornithologists have been more successful!"

"The bird, which I send herewith, showed that the breeding season was then (July 5th) in progress, its testes were much enlarged. I found several small sun-beetles in its gizzard."

P. T. L. DODSWORTH, F.Z.S., M.B.O.U.

SIMLA, W., 17th October 1913.

No. XIV.—THE BREEDING HABITS OF THE BROWN-BACKED  
INDIAN ROBIN (*THAMNOBIA CAMBAIENSIS*) IN THE  
JUNGLES OF THE C. P.

The following notes were on the nesting of the Brown-backed Indian Robin made in the Chanda District during April 1913 :—

All the nests were found between 1st April 1913 and 31st May 1913.

This robin appears to be very versatile in its nesting habits, both in the choice of the site for its nest, the amount of material used in its construction, also in the number of eggs it lays.

Oates says, four to six is the usual number, but on no occasion did I find more than 3 eggs which was the usual number, while some nests only contained two. Nests varied from a flimsy construction of a few bents to a massive nest and were placed on the ground and any distance from the ground up to twenty feet. On several occasions I found nests lined with pieces of the "slough" of snakes. From my observations I have come to the conclusion that this bird brings up two successive broods in the year.

Appended is a list and description of nests taken.

A.—1st April 1913.—Konsuree, Chanda, one egg fresh.

2nd April 1913.—By a road in the fork of a Pitas tree about 4 feet from the ground, one egg fresh.

Nest.—Cleverly hidden in the fork of a Pitas tree about 4 feet from the ground. Composed of bents, dead grass and twigs.

Eggs.—Spotted with brown, grey, purplish and maroon: more thickly and a ring at larger end.  $\cdot 82'' \times \cdot 59''$ ,  $\cdot 86'' \times \cdot 60''$ , average =  $\cdot 84'' \times \cdot 595''$

B.—8th April 1913.—Huldee, Chanda. In the Jungle (scrub and thorn thickets), 3 eggs. Incubation very advanced.

Nest.—A neat little nest of dead grass, lined with pieces of a snake's slough, placed in a hollow in the stump of a broken tree about three feet from the ground.

Eggs.—Greenish white, spotted and speckled with brown and purplish grey. Thickly spotted at larger end where there is a ring of purplish grey.

$\cdot 82'' \times \cdot 64''$ ,  $\cdot 80'' \times \cdot 63''$ ,  $\cdot 81'' \times \cdot 62''$ ; average =  $\cdot 81'' \times \cdot 63''$ .

C.—9th April 1913.—Huldee, Chanda. In the jungle (scrub and thickets), 1 egg and 1 young one. Egg hatching: young one just out of shell.

Nest.—Placed in a hole in the dead top piece of the trunk of a small tree; about 14 ft. from the ground and about one foot down in the hole. Composed of dead and dry grass, bents and stalks, lined with finer grass and fibrous roots. Nest scanty.

Eggs.—For description and colour, see previous notes. No measurements taken.



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D.—10th April 1913.—Huldee, Chanda. In the fields, near the village, 1 egg and 1 young one. Young one just hatched.

*Nest*.—Placed in a well-hidden hollow, at the side of a stump. About 4 ft. from the ground and screened by a mass of thick thorn. A very large nest with bulky foundation. Composed of dead grass and bents; lined with finer grass.

*Eggs*.—For description and colour, see previous notes. No measurements taken.

E.—10th April 1913.—Huldee, Chanda. Just at the edge of the jungle (well tree-ed thickets).

Two eggs. Incubation very advanced, almost hatching.

*Nest*.—Placed at the foot of a small tree, well concealed in a hollow in the ground. Composed of dead grass and bents, lined with pieces of the 'slough' of a snake.

*Eggs*.—Pale greenish white, spotted and speckled with brown, greyish and purple grey, more thickly at the larger end.  $\cdot 78'' \times \cdot 58''$ ,  $\cdot 76'' \times \cdot 60''$ ; average =  $\cdot 76'' \times \cdot 59''$ .

F.—19th April 1913.—Walsera, Chanda. At the edge of the jungle by the village in a small thicket.

3 eggs, fresh.

*Nest*.—Placed in a hole in a stump about  $3\frac{1}{2}$  ft. from the ground very little in the way of nest. Just a few pieces of dead grass, lined with pieces of a snake's "slough."

*Eggs*.—Pale greenish white, thickly spotted and speckled all over with brown, sepia, grey and blue-grey. More thickly and merging into a ring at the larger end. One egg is blotched.  $\cdot 79'' \times \cdot 60''$ ,  $\cdot 76'' \times \cdot 62''$ ,  $\cdot 74'' \times \cdot 62''$ ; average =  $\cdot 77'' \times \cdot 61''$ .

G.—20th April 1913.—Walsera, Chanda. In the jungle, in a slight clearing, fairly open jungle, thinly tree-ed. 1 egg and 1 young one.

Egg just hatching: Young one just hatched.

*Nest*.—Placed in a hole in a stump, about 5 feet from the ground. Very little nest, just a few bits of dead grass placed to soften the hollow.

*Egg*.—Pale greenish white, thickly spotted and speckled all over with brown and sepia.

*Young one*.—Darkish in colour, with tufts of black down.

No measurements taken.

H.—26th April 1913.—Huldee, Chanda. In the jungle (Teak Forest) 3 eggs. Fresh.

*Nest*.—Placed about two feet from the ground in the hollow trunk of a small tree. Very narrow entrance. Composed of a few sticks and stalks for foundation, with nest of dead grass: no lining.

*Eggs*.—Pale greenish white, thickly spotted and speckled, more so at the large end where there is a ring of colour, with brown sepia, bluish grey and purplish grey. One egg unfortunately was smashed in withdrawing it from the nest. One egg was spotted with a fine dark ring at the larger end; the other is speckled and the rings not so distinct, the speckling being thicker.

$\cdot 77'' \times \cdot 62''$ ,  $\cdot 77'' \times \cdot 63''$ ; average =  $\cdot 77'' \times \cdot 625''$ .



- I.—27th April 1913.—Huldee, Chanda. In the jungle (thin forest and thickets), 3 eggs, fresh.  
*Nest*.—Placed in a hole in the side of a broken stump, about 2 feet from the ground. Composed of dead grass and fine stalks, lined with a few bits of black hair.  
*Eggs*.—Pale greenish white, spotted and slightly speckled with sepia brown, bluish grey and purple grey. Spotted all over, more thickly and ring shaped at the larger end.  
 $\cdot 80'' \times \cdot 62''$ ,  $\cdot 76'' \times \cdot 62''$ ,  $\cdot 79'' \times \cdot 62''$ ; average =  $\cdot 76'' \times \cdot 62''$ .
- J.—2nd May 1913.—Jamgiree, Chanda. Near a jungle road (forest and scrub), 3 eggs, on the point of hatching.  
*Nest*.—Placed in a hollow stump at the top. About 5 feet from the ground. Quite a massive nest of small bents, stalks and dead grass and roots.  
*Eggs*.—Pale greenish white, speckled and spotted all over with sepia, brown, bluish-grey and purplish-grey.  
 $\cdot 81'' \times \cdot 58''$ ,  $\cdot 81'' \times \cdot 58''$ ,  $\cdot 78'' \times \cdot 59''$ ; average =  $\cdot 80'' \times \cdot 58''$ .
- K.—3rd May 1913.—Koothegaon, Chanda. By the side of a jungle path (thin forest), \* 2 eggs, one young one.  
 Eggs on the point of hatching. The young one just hatched.  
*Nest*.—Placed at the bottom of a stump in a hollow about 8 inches above the ground. A heavy massive nest of dead grass and stalks lined with finer materials.  
*Eggs*.—Pale greenish white, spotted and speckled all over with sepia, brown, bluish-grey and purplish-grey; more thickly and ring-shaped at the larger end.  
 No measurements taken.
- L.—4th May 1913.—Koothegaon, Chanda. In scrub jungle on a grassy plain. No eggs.  
*Nest*.—Usual type, lined with pieces of a snake's slough. Placed in a hole at the top of a stump, about 5½ ft. from the ground.
- M.—31st May 1913.—Vithulwara, Chanda. Placed in the eaves of a P. W. D. Bungalow, 2 young ones and 1 egg.  
 Egg probably unfertile, young ones a few days old.  
*Nest*.—A slight construction of dry grass and fine roots, lined with softer materials; about 10 feet from the ground.  
 Eggs not taken, so no measurements.  
 Average of all the eggs taken by me works out at  $\cdot 79'' \times \cdot 69''$  which makes my eggs a bit bulky than Oates' measurements of  $\cdot 79'' \times \cdot 59''$ .

C. R. S. PITMAN,  
 27TH PUNJABIS.

JUNE 1913.

\* These two eggs were lying on cotton wool in my tent and hatched out on the 4th and 5th May.

#### NO. XV.—NESTING OF *ANTHUS SIMILIS*, JERDON (THE BROWN-ROCK PIPIT).

The fact that the Brown-Rock Pipit (*A. similis*) is a common summer visitor to the lesser ranges of the Himalayas is well known, but during the last three or four years my friend, Alec. Jones, has demonstrated to me, on more than one occasion, that a few of these birds nested every year,



close to Simla, and as high as 7,000 feet. Jones has actually taken two nests at this altitude, and he thus describes his finds:—

"16th May 1909.—This morning whilst searching the hillside for Pipits' eggs, I had the good fortune to flush a Brown-Rock Pipit (*A. similis*) from her nest, and found 4 slightly incubated eggs in it. The nest was beautifully concealed under a tussock of grass, and had I not seen the bird leave the spot, I should never have found its abode. The eggs resemble very closely the eggs of the Upland Pipit (*O. sylvanus*). The speckling is, however, appreciably finer, and the ground colour more of a stone or greyish-green tinge. Nest of grass blades: lining, fine grass stems. Elevation 7,000 feet."

"27th June 1909.—A nest and 4 hard set eggs of *A. similis*. Nest well concealed, and placed under a small creeping plant. Structure made of grass, and more substantial than the one mentioned above. Female shot and identified. Eggs finely speckled and closely resembling the former clutch. The ground colour was, however, a pale creamy-white: elevation 7,000 feet."

The following is an extract from my diary, relating to a nest of this Pipit, taken on the 22nd June in Keonthal territory, about six miles from Simla, N. W. Himalayas:—

The result of to-day was, among other eggs, a beautiful clutch of 4 eggs of the Brown-Rock Pipit (*A. similis*). We had just emerged from a 'deodar' forest, and were traversing a steep grassy slope, bordering on some fields, when a male of the Brown-Rock Pipit flew past overhead, uttering his characteristic note. This immediately put us on the alert, and he had scarcely proceeded a few steps further, when our attention was diverted to the curious behaviour of another Brown-Rock Pipit, which was tumbling and fluttering about, close to us, on the ground, in a most extraordinary manner. The dogs at our heels soon caught sight of this rolling ball of feathers, and were instantly in hot pursuit after it; but, of course, we knew what these "injury feigning" tactics meant, and quite disregarding the bird and its attempts to divert us from the spot, commenced making a thorough search for its nest, which we shortly afterwards discovered. It was placed in a hole of the bank under a tuft of grass, and, as already stated, contained 4 eggs, which were slightly incubated.

The nest was a shallow cup, composed exteriorly of coarse grass-stems, roots, pieces of sticks, with some moss attached here and there to its sides, and lined with very fine grass stems. It measured:—diameter of egg-cavity 3": depth of ditto 1.25": external diameter 4.25: thickness of sides .65": thickness of bottom .5".

The altitude of the spot was fully 6,000 ft.

On comparing 10 eggs of this Pipit with 16 authentic specimens of the Upland Pipit (*Oreocorys sylvanus*), taken in the neighbourhood of Simla, I find the following differences:—

- (a) The eggs of *Anthus similis* are smaller than those of *Oreocorys sylvanus*: 10 specimens of the former, average .83" x .65"; while 15 of the latter, average .89" x .68".
- (b) The markings are different. The eggs of *Anthus similis* are finely and profusely speckled and spotted all over with various shades of dark and dull sienna-brown and pale inky-purple, some of the eggs are so heavily marked that they closely resemble the very dark type of eggs of *Passer domesticus*. On the other hand the ground colour on most of the eggs of *O. sylvanus* is clearly visible, and the markings are, on the whole, much bolder and "more spotty."



They have a good deal of the reddish and purplish brown, with pale inky purple, and in most of the specimens, the markings are chiefly towards the large ends, where they show a tendency to form irregular caps or zones.

P. T. L. DODSWORTH, F.Z.S., M.B.O.U.

SIMLA, W., 10th September 1913.

No. XVI.—NESTING OF HODGSON'S HAWK EAGLE  
(*SPIZAETUS NEPALENSIS*, Hodgs).

As it is stated that this species invariably breeds on *trees*, it may be of some interest to record that on the 6th January 1913, I found a nest in the process of construction, which was placed *on the face of a huge cliff* overhanging the Ashni River, near Solon, 5,000 feet, N. W. Himalayas. Both the old birds were noticed carrying sticks.

For almost a month after this, the weather became most unsettled, and it was not till the 18th of the following February that I was able to visit the spot again. On arrival, I found that the nest was tenanted—both the old birds sat in it by turns—and immediately made the necessary “bun-dobust” to lay siege to the eyrie. Owing to its difficult position, it had to be approached with great caution; and after several ineffectual attempts, during which my climber twice got jammed in a narrow fissure, just above the nest, he reached the structure and lowered me down its contents—two very hard set eggs. The birds hovered about while the man was in the nest, but made no “demonstrations” whatever.

The specimens were broad ovals: ground colour, a dull white, and sparingly blotched and spotted (one chiefly at the large end, and the other chiefly at the small end) with shades of dingy and reddish-brown. They measure  $2.81" \times 2.17"$  and  $2.77" \times 2.17"$ .

The nest was a mighty structure of twigs and sticks. In the centre there was a depression, lined with green leaves on which the eggs reposed. Judging from the successive layers of sticks composing the base of the nest, I should think that it had been used by these birds for many years.

The young chicks, or rather bits of them, which were got out *above*, were covered with greyish-white down.

I may add that this species is to be seen throughout the year in the outer ranges here between elevations of 3,500 and 5,000 feet. To the hillmen it is known as the “Muriaree.”

P. T. L. DODSWORTH, F.Z.S., M.B.O.U.

SIMLA, 2nd October 1913.

No. XVII.—PLUMAGE OF THE NESTLINGS OF (i) THE KOKLA GREEN PIGEON (*SPHENOCERCUS SPHENURUS*, Vigors), AND (ii) THE BEARDED VULTURE OR LAMMERGEYER (*GYPÆTUS BARBATUS*, LINNEUS).

(i) *Kokla Green Pigeon (S. sphenurus)*.

The whole of the upper plumage is dull-green, slightly brighter on the head, upper tail-coverts, scapulars and lesser and median wing-coverts. Greater coverts dull-green and edged on the extremities of the outer webs with pale-yellow, forming a bar. Winglet blackish, primary-coverts blackish, primaries blackish and the majority of them very faintly edged



on the outer webs with pale-yellow; secondaries blackish, and also edged on the outer webs with pale-yellow; tertiaries dull-green.

In the lower plumage, the feathers of the throat, breast and upper portion of the abdomen are pale-grey edged with greenish-yellow; the feathers on the abdomen and vent fluffy yellow-white, thigh-coverts pale fluffy-grey, tipped with dark-green; undertail coverts dull-green, broadly edged with pale-yellow.

*Bill*, light fleshy-brown, tipped with dusky; there is a tinge of blue at the base of the lower mandible. *Orbital skin*, very dull-blue. *Iris*, brown. *Tarsi and feet*, fleshy-brown, the former have a tinge of dull blue on their upper extremities. *Soles of feet*, very pale fleshy-brown. *Claws*, brown horny, darker at tips.

(ii) *Bearded Vulture* (*G. barbatus*).

*Simla, 7th May 1911*.—Visited the Lammergeyer's eyrie to-day. There was only one young about a month and a half or a couple of months old in the nest, and we had this brought down, and subjected it to a most careful examination.

The whole of its body, almost the whole head, neck, the upper and lower surfaces of the wings and tarsi were covered with down of a light brownish-grey. The primaries (which were about 3" in length), secondaries, tertiaries, scapulars and tail feathers (about 2½" long), were beginning to sprout, and were of a dark brownish-black colour. The back of the crown had a few brownish-black feathers showing through the down, and a few feathers of a pale buffy-white (much lighter than the down), and intermingled with blackish ones, were sprouting up here and there from the neck. A few feathers also of a buffy-white, intermingled with a few brown ones, were sprouting from the chest and sides of the body.

The bill was of a light-greenish horn colour, darker at the tips. The lores and base of the upper mandible were covered with the usual black bristles, about a quarter of an inch in length. Similar bristles and of a similar length, projected from the base of the lower mandible.

The gape was fleshy and also the mouth; pupil of eye, black; iris, light hazel; sclerotic membrane, blood-shot.

The feet were of a pale leaden green; the claws, which were long and very sharp, were of a shining jet black, their undersurfaces being whitish; soles of feet, whitish.

Feet absolutely bare, *no feathers of any sort on side of mid-toes*.

In connection with the above note, it is interesting to mention that, according to Gurney (*Raptorial Birds in the Norwich Museum*, Pt. I., pp. 82-83) both adult and immature specimens of these birds occasionally "present the singular peculiarity of a row of small feathers running down the outside of the first joint of the middle toe." The late Captain Hutton in describing (*Rough Notes*, p. 40) a young bird of this species states that one of the toes had a bunch or tuft of feathers on it. I have never yet come across this peculiarity in any of the birds that I have shot from time to time, and, on referring to Hume, I find that he also comments on the absence of this peculiarity in his specimens.

P. T. L. DODSWORTH, F.Z.S., M.B.O.U.

SIMLA, 2nd October 1913.

NO. XVIII.—THE HABITS OF THE PAINTED SPUR-FOWL.  
(*GALLOPERDIX LUNALATA*).

During May 1913, I had many opportunities of studying the habits of the Painted Spur Fowl (*Galloperdix lunata*). I have found them in the



Central Provinces in vast quantities about lat.  $80^{\circ}15'$  E. and long.  $19^{\circ}50'$  N. on rocky forest covered hills grantoid gneiss grass, and they seem more partial to those covered with Bamboo Jungle. I never saw them in the valleys, unless they had been frightened there from the crest or sides of the hill near the crest. The more open and grassy the crest line of the hill, the more likely was one to find several pairs of Painted Spur Fowl there. As the birds were very plentiful, I shot several to examine and also for skins for the Society, although it was in the close season. However I came across many broods and by this time "cheepers" were very strong on the wing and almost as large as and similarly coloured to the adult hens. I found the best way to beat them out, was to walk along the crest of a hill with a beater in line with one on either side of the hill and about 60 yards down it.

The birds if on the hillside would always run up and, on seeing me at the top, often rose at once and flung themselves headlong down the hill or went shooting along the crest. I never saw one actually fly up a hill in, cold blood, but in cases where birds had scuttled down to a lower crest they often broke back, flying part of the way back to their original refuge.

Both seem often perched in trees when frightened. I did not find them very difficult to flush, although if the cover and ground suited them they much preferred to run. The males usually rose with what I describe as a curious bubbling half scolding clucking note, which sounds rather complex, but I find it hard to describe. I used to hear Fowl calling on the hills during the night, but did not know whether it was this spur fowl as well as the grey jungle cocks.

I only once saw them drinking and at that time a pair came down to a pool in a nullah at 6-30 a.m.

At this date (May), the breeding season was apparently over. I found two nests with the remains of 2 and 3 eggs in them, out of which the young had been hatched. I should not say nest, as the eggs were in a hollow in the ground under a projecting piece of rock. They were both on the slope of a hill not far from the crest.

As regards their food, it seemed to be mostly vegetable matter, but in all their crops that I examined was practically nothing but "mush" and some rotten old and stale Mhowah flowers.

In regard to the number of spurs, I noted carefully the number carried by all I shot, which was as follows:—

1 ♂ 3+3, 2 ♂ 3+2, 2 ♂ 2+2; 4 ♀ 2+2, 3 ♀ 1+1, 1 ♀ 1+0.

4 immature and almost full grown specimens had no spurs.

C. R. S. PITMAN,  
27TH PUNJABIS.

DERA ISMAIL KHAN, N.-W. F. P.,  
9th August 1913. }

#### NO. XIX.—NOTES ON THE GAME BIRDS OF THE BASTI DISTRICT, U. P.

Living in the adjoining district of Basti, I have read with interest the article in your issue of 20th December 1913 by Mr. A. E. Osmaston, I.F.S., upon the Birds of Gorakhpur. The Basti district resembles Gorakhpur precisely, save that the sal forests that covered a great portion of both within living memory have now totally disappeared from the former. Consequently, with the exception of purely forest forms, such as the red jungle fowl, the Avifauna is identical. I regret that my own knowledge



## MISCELLANEOUS NOTES.

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of Indian birds does not extend beyond the varieties classified as game. However, the bag of a sportsman during two consecutive seasons may be of interest to your readers, and I append it—

1912-13.	1913-14 up to 9th January 1914.
3 Grey partridges, <i>Francolinus pondicerianus</i> ..	0
3 Quail, <i>Coturnix communis</i> .. .. .	1
7 Hill Pigeons, <i>Columba rupestris</i> .. .. .	0
4 Peewits, <i>Vanellus vanellus</i> .. .. .	0
372 Snipe, <i>Gallinago celestis</i> .. .. .	410
2 Mallard, <i>Anas boscas</i> .. .. .	5
11 Gadwall, <i>Chaulelasmus streperus</i> .. .. .	52
17 Teal, <i>Nettion crecca</i> .. .. .	57
13 Garganey teal, <i>Querquedula circia</i> .. .. .	7
11 Red crested pochard, <i>Netta rufina</i> .. .. .	11
71 White-eyed pochard, <i>Nyroca africana</i> .. .. .	32
1 Red-headed pochard, <i>Nyroca ferina</i> .. .. .	6
1 Tufted pochard, <i>Fuligula fuligula</i> .. .. .	6
1 Grebe, <i>Podicipes p.</i> .. .. .	1

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Birds shot this year only are—

Spotted-billed duck, <i>Anas pæclorhyncha</i> .. .. .	2
Pintail, <i>Dafila acuta</i> .. .. .	7
Widgeon, <i>Mareca penelope</i> .. .. .	6
Grey goose, <i>Anser rubirostris</i> .. .. .	2
Golden plover, <i>Charadrius fulvus</i> .. .. .	2

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It is certain that 1913-14 has been a better year for sportsmen in the Gorakhpur Division than 1912-13. The drought in Northern India has driven down birds in large numbers that usually winter in colder climates.

It is instructive that there should be fewer white-eyed pochard this year than last. These birds want plenty of water, and do not mind the heat, so are presumably in Lower Bengal. However the ducks that feed on the surface, such as gadwall, pintail, widgeon, mallard, find water enough in Basti for all their necessities, and are here in exceptional numbers. I fancy that Mr. Osmaston should include the grey goose and common crane as constant cold weather residents of Gorakhpur. One does not get them, but they are there all right, the grey geese in the middle of the big jheels and the cranes somewhere near the barred headed geese on the sandbanks. I would like to be sure that the pintailed snipe is common. To the best of my belief I have never seen a pintailed snipe in my life, though I have shot snipe in the United Provinces in thousands. I would also like to know when the favourable year for quail is coming, and what determines it. My own experience of three years in Basti and the adjoining two submontane districts of Gonda is that one may pack up ones shot gun, when one is away from the jheels. Yet quail were abundant (in 1895) in the very next submontane district, namely, Bahraich. It seems to me that jungle grass is essential to the welfare of dry game, such as hares, partridges and quail, and that they can't thrive in closely cultivated districts. The absence of cover in the hot weather does not explain everything. Quail are not affected by it, and hares ought to adopt themselves by taking to holes in the ground. A possible explanation seems to



me to be the absence of protection against heavy night dews. For 16 hours out of the 24, the dry game has to endure a cold bath, and their constitution will not stand it.

W. B. COTTON, c.s.

BASTI, U. P., 9th January 1914.

NO. XX.—THE SMALL INDIAN PRATINCOLE (*GLAREOLA LACTEA*, TEMM.)

In working at the plumage of this common species I have lately had occasion to look up its history and distribution, and have been struck by the paucity of records regarding it. In the Fauna, Vol IV, p. 217, its distribution is summed up as follows:—"Resident in suitable places throughout the plains of India, Ceylon and Burma, as far west as the Indus. Found in Kashmir, but not observed elsewhere in the Himalayas. Unknown outside our area."

Now this is not quite correct, for in portions, at all events, of its range it is highly migratory; for instance, Capt. Whitehead in his "Birds of Kohat and the Kurram Valley" writes:—"A summer visitor from April till August. Col. Rattray found it breeding freely on the banks of the Kurram River in April. It was very common when we passed through Thall in April and on our return in May."

In my own experience I have found it as a very numerous summer visitor from roughly March to October on some of the Punjab rivers; here on the River Jhelum it occurred in extraordinary numbers this past year.

Now, even if the bird is a resident species, generally speaking, it is not so in the Punjab and N.-W. F. P., which, therefore, supply an enormous number of individuals that must appear as winter visitors in some other portions of our area; the suddenness of their departure and arrival points to the migration being a real one, and not merely a gradually southerly or northerly movement dependent on the approach or cessation of cold weather. Is there then any portion of our area in which the species is a winter visitor only? Or do these birds disperse over a large area which has its own resident population? And is that area so large that the addition of these Punjab birds makes no appreciable difference? These are questions to which I can find no answer: perhaps some of our members can enlighten me. It should be an easy matter to clear up. The species is entirely confined to our area; it is very common and most easily recognized, and is known to both sportsmen and naturalists.

Surely, if each member wrote on a postcard the places and months where and when he has met with the bird; and any other particulars he may be able to add about nesting and migration, and these postcards were sent to a common destination, e.g., one of our Committee, the material thus forthcoming might be sufficient to throw light on the problem?

HUGH WHISTLER.

JHELM, 21st January 1914.

NO. XXI.—SWINHOE'S SNIPE (*G. MEGALA*) IN BURMA.

I enclose what I believe to be the skin of *Gallinago megala*, Swinhoe's Snipe, shot by me in the Tharrawady District on the 5th November. The bird was flushed in some tall king grass while shooting Fantail and Pintail.



In Vol. XIX, No. 5 of the Journal of 24th June 1910, I see that there are only 2 records of this Snipe's occurrence in India. I send therefore the skin to add to any further records that may have been received since the above date.

C. GWYER, I.F.S.

THARRAWADY, L. BURMA,  
8th November 1913.

[The skin is, as Mr. Gwyer thought, that of Swinhoe's Snipe, *Gallinago megala*, and is the fourth record of the bird within our area, Capt. Venning having recorded one from Pyawle in 1911, in the Journal Vol. XXI, p. 269.—Eds.]

#### No. XXII.—SOLITARY SNIPE AT QUETTA.

Since the end of September, 10 Solitary Snipes, *Gallinago solitaria*, have been shot here mostly in gardens round cantonments. I think I am correct in saying that there is no record of one having been shot here for 40 years before this. We have had particularly mild weather so far so that hard weather can hardly be the cause. I do not know if Solitary Snipe migrate in numbers, but if so I should say the solution was that they have found better food coming down by this route than by their old route wherever that was. It would be interesting to know if there has been a scarcity of them in any place where they have been observed in any numbers before.

B. L. CLARKE.

QUETTA CLUB, 11th November 1913.

#### No. XXIII.—A NOTE ON THE SUB-SPECIES OF THE SPOT-BILL DUCK (*ANAS PÆCILORHYNCHA*.)

In the Bombay Natural History Journal, Vol. XVII, p. 558, the late Mr. E. W. Oates described a new form of *Polionetta* (*Anas*) under the name of *Polionetta haringtoni*. At that time I considered that this duck had been so named on insufficient material, and when writing "Indian Ducks" I refused to accept the duck as a good species.

The Society are now in possession of quite a good series of skins, 10 in number, of the supposed *haringtoni*, and these have been sent home for me to examine, together with the British Museum skins of *zonorhyncha*, the Chinese Spot Bill, and *pæcilorhyncha*, the Indian Spot-bill. This material has enabled me to modify my former opinion, and I now think we can fairly satisfactorily discriminate between the three sub-species, *pæcilorhyncha*, *zonorhyncha* and *haringtoni*.

The skins available for examination in the British Museum collection are as follows :—

Typical <i>pæcilorhyncha</i> .. .. .	19 skins.
Typical <i>zonorhyncha</i> .. .. .	12 "
Skins labelled <i>pæcilorhyncha</i> from Burmah .. .	6 "
The Bombay Skins .. .. .	10 "

In addition to these I have been able to examine about forty other skins from India, Burmah and China.

The result of my examination shews that *Anas pæcilorhyncha haringtoni* is the connecting link between the two other forms *p. pæcilorhyncha* and *p. zonorhyncha* and that the three forms may be discriminated according to the following key, though it must be remembered that amongst these, as with all other sub-species, individuals are to be met with, more especially in the area where two forms meet, which cannot well be placed definitely in any one of the three.



## KEY TO SUB-SPECIES.

(A.) A broad white band posterior to the speculum—

- a. A red spot at base of bill on either side,  
average wing measurement 10"60, bill  
from forehead to tip 2"14 .. .. *p. pacilorhyncha*.  
b. No red spots at base of bill, wing average  
10"25 and bill average 2"05 .. .. *p. haringtoni*.

(B.) No white band posterior to the speculum .. .. *p. zonorhyncha*.

The measurements of the three sub-species overlap very considerably, but the following table gives the average measurements of the bills and wing, together with the extremes between which they range. It includes both sexes.

## BILLS

		AVERAGE.	LEAST LENGTH.	GREATEST LENGTH.
<i>Anas p. pacilorhyncha</i>	.. ..	2"14	1"95	2"30
" " <i>zonorhyncha</i>	.. ..	2"07	1"85	2"25
" " <i>haringtoni</i>	.. ..	2"05	1"93	2"26

## WINGS

		AVERAGE.	LEAST LENGTH.	GREATEST LENGTH.
<i>Anas p. pacilorhyncha</i>	.. ..	10"60	9"58	to 11"50
" " <i>zonorhyncha</i>	.. ..	10"71	10"20	to 11"30
" " <i>haringtoni</i>	.. ..	10"25	9"30	to 10"75

From this it will be seen that *pacilorhyncha* has a bigger bill than either of the other two sub-species which are equal in this respect, whilst *haringtoni* has, sex for sex, a smaller wing than either of the others which have wings practically the same in size.

The under plumage of Harington's Duck agrees with that of the Common Spot-bill in being paler below than in the Chinese bird, *i.e.*, a pale buff or brownish buff, profusely spotted on breast and abdomen with circular spots of dark brown, whilst the Chinese Spot-bill has the colour of the breast and abdomen much darker, generally a fairly uniform brown, upon which the spots hardly show, and which contrasts quite strongly with the pale throat and chin.

The colouration of the lower parts is not, however, very constant, and there is a specimen of *zonorhyncha* from China (Canton) and another from Shanghai which are as pale below and as well spotted as any specimens of *pacilorhyncha* from Western India.

Another difference in the colouration of the two original species *zonorhyncha* and *pacilorhyncha* which is generally commented on, is the colour of the speculum which is blue in the former and green in the latter. This blue or green question is always a very difficulty one to decide, but I may say that the speculum of *pacilorhyncha* looks green in whatever light you chance to hold it, though more blue and less green when held tail pointing to the light. In *zonorhyncha* the speculum is always a deep purple blue, though this too, when held head towards the light, is slightly suffused with green. If series of the two species are placed alongside one another in the same light and pointing the same way the difference is quite distinct.

*Haringtoni* has the speculum green like that of *pacilorhyncha*.

Yet another difference which must be mentioned is the amount of white on the innermost secondaries. In the Indian birds nearly the whole of the outer webs are white whilst in the Chinese birds there is very little



white at all upon them, and in some individuals none. The Burmese birds are intermediate in this respect.

The range of the three sub-species would seem to be as follows:—

*pacilorhyncha*. India as far as Western Assam, and in Cachar, Sylhet, Chittagong and possibly into Arakan.

*haringtoni*. The whole of Burmah, including Shan States and Chin Hills, Yunnan, Cochin, China and possibly South-Western China adjoining Burmah.

There is one typical specimen of *haringtoni* in the British Museum, said to have been collected by Reeves in China, but the exact locality is not given.

It also extends into Assam in the extreme East, being met with in Lakimpur and Teypur and, more rarely, in the district of Sibsagar in that Province.

*zonorhyncha*. Southern and Eastern China from the borders of North and North-East Burmah as far as, and including, Japan.

In giving the measurements above I have not been able to discriminate between the sexes as a whole, so many of the skins in the British Museum not having been sexed but judging from those which are sexed the females are consistently smaller than the males in all three sub-species.

I still retain the general name *Anas* for these ducks, as I can see no reason for separating them.

E. STUART BAKER, F.Z.S., F.L.S., M.B.O.U.

LONDON,  
November 1913.

#### NO. XXIV.—BREEDING OF THE MARBLED TEAL (*MARMA- RONETTA ANGUSTIROSTRIS*) IN BALUCHISTAN.

In reply to your request for particulars regarding the breeding of the marbled teal in Baluchistan, I will let you know the little I was able to observe in this respect during the summer of 1913, on the Khushdil Khan Lake, near Peshin.

After the return, migration of ducks in March and April, a few ducks were left on the Khushdil Khan Lake. The largest proportion of these were marbled teal which had apparently made up their minds to spend the summer here. About June, I observed a couple of birds, which had paired off frequenting a small island. These two remained together and did not stay with the other marbled teal. I did not find their nest. I think it was in August, though I do not recollect the date, that while in a boat on the lake, on rounding a point on the same island, I disturbed a duck which entered the water with 14 ducklings about a week old. I gave chase and the duck went through the well-known tactics of her kind by pretending that she was wounded and lagging behind her ducklings. She gradually made off in a direction away from her ducklings. However, as I wished to identify her I did not mind. This I was able to do as she let the boat come within a yard of her and was undoubtedly a marbled teal. When she thought her ducklings were a safe enough distance from us, she rose quite easily and went off. These were the only ducklings I observed at the Khushdil Khan Lake (5,000 feet above sea level) during the year. The probability is that more ducks would breed here if there was sufficient cover for their nests and if they were not disturbed by the numerous flocks of sheep which graze on the shores of the lake.

A. B. AITKEN.

QUETTA, 19th January 1914.



No. XXV.—OCCURRENCE OF THE SMEW (*MERGUS ALBELLUS*) IN THE UPPER CHINDWIN.

Whilst shooting with a party on December 11th, two birds were seen by myself and several others, which I have little doubt were Smews. Unfortunately, they were far out of shot, but the general appearance of the bird was white, and black markings on the head and wings were clearly visible. If they were not Smews, can any member suggest what they were likely to be?

CYRIL HOPWOOD, I.F.S.

KINDAT, U. CHINDWIN, BURMA,  
17th December 1913.

No. XXVI.—THE COMMON AND SIND KRAITS (*BUNGARUS CÆRULEUS* AND *SINDANUS*).

## A CORRECTION.

On page 401 of Volume XXII of this Journal, I commented upon a krait that had been sent to me from our Secretary reported to have come from Jhelum. This specimen was one with 17 scale rows, and I remarked that it was the first that I had any knowledge of with 17 rows from the Punjab. I have now heard from the donor Captain F. L. Hughes that he captured it at Dera Ismail Khan, but omitted to specify the locality when sending a small collection of snakes from Jhelum to our Secretary. The correction is an important one in view of my remarks already alluded to, and I think further evidence is called for in regard to the distribution of 17 scale kraits before pronouncing the two supposed species *cæruleus* and *sindanus* identical. I may further remark that Captain Hughes tells me he killed several kraits at Dera Ismail Khan, and that all had 17 scale rows.

F. WALL, MAJOR, I.M.S., C.M.Z.S.

ALMORA, 14th January 1914.

## No. XXVII.—SNAKE-CHARMER'S PERFORMANCE.

With reference to the Miscellaneous Note (No. XXXIII) in the current Volume (p. 636) by Captain Venning, I saw an almost similar performance in Minbu in 1911. The snake in my case was as nearly as could be measured just under 12 feet. The fangs had not been removed. As in Captain Venning's case, I noticed that it took a lot of noise and pulling about to rouse the snake. Also that when the snake did strike, it only partly opened the mouth or more often did not open it at all. The snake also appeared to have a very bad aim and to strike and move heavily and clumsily so much so that I came to the conclusion that it was heavily drugged. The snake charmer (?) denied this. After watching the performance closely for some time I took the snake myself and examined it close by examining its teeth and looking for any injury and particularly for the smell of opium, but could detect nothing wrong. The snake made no attempt at any active movement while I was handling it nor when quietly released did it attempt either to attack or escape. It took a good shake at its tail from its owner to rouse it again. My man did not lick the snake but once or twice struck the snake lightly on the point of the nose with his fingers.



I have always been firmly convinced that that snake was drugged probably by the administration of an opium pill and I am the more certain because the owner made no objections to my handling the snake, which I think he would have done if he had not been sure that the snake was harmless in its then condition.

A. G. FRERE, CAPT., I.A.

ST. THOMAS MOUNT,  
MADRAS, 8th January 1914.

#### NO. XXVIII.—FOOD OF TROUT (*SALMO FARIO*) IN KASHMIR.

With reference to cannibalism by trout, I would here note my observations in Kashmir on this point.

(1) I have never yet caught a trout with a trout inside it, though it is the commonest thing to find loaches and other small native fish in trout caught. Mr. Phelps tells me that his experience in this respect corresponds with mine.

(2) During the last few days we have been collecting the small trout cut off in parts from the rapidly drying bed of the lower Arran. In catching and bringing these into the ponds in the warm sun, a certain percentage generally die. Sodhama, when feeding the big trout in one of the ponds threw in 20 or 30 of these small dead trout. No doubt some of them were swallowed as they were thrown in as these big trouts are accustomed to get native fish of about the same size, but most of them are still\* lying untouched in the bottom of the pond. Sodhama says that some of these were ejected and they bear marks confirmative of this. The trout of the pond still\* continue to take greedily any small Kashmiri fish thrown in. My attention was drawn to what had occurred by seeing so many small dead fish in the clear water of this pond. I think the above seems to indicate that cannibalism is not natural among *S. fario* and is only resorted to in special cases where other food is not available or possibly as in the case of man-eating tigers where the taste has been acquired during a period of starvation due to some special cause. When food of other species is available in sufficient quantities there appears to be little danger of the cannibalistic tendency developing.

SRINAGAR,  
November 17th, 1913.

F. J. MITCHELL,  
Director, Trout Culture.

#### NO. XXIX.—PERIODS OF FLIGHT OF CERTAIN BUTTERFLIES.

On page 26 of Vol. XIX of the Journal, in the series on Common Butterflies of India, it is stated that "the vast majority breed more or less all the year round. The matter of the number of broods seems to depend really altogether on the food-plant, if it is one that produces young leaves only once in the year and at a particular season, the butterfly whose larva feeds on those young leaves will be found only at that time; if it has eatable leaves all the year round, and if the caterpillar will feed upon more than young leaves also, then the butterfly will have broods following each other without intermission though the time between any two will always be shortest when the leaves are young and fresh."

\* When this was written two or three days later.



As the words "all the year round" above, might by some be misunderstood to apply generally throughout India, rather than to the Plains of India and Hill Stations of the Bombay Presidency to which more especially Mr. Bell's paper refers, the following few notes may be of interest:—

Having made observations and notes as opportunity occurred, both in the hills and in the plains, during the past 5 years, it has struck me that the facts disagree with this statement, as regards the North-West of India at least. Of over 100 forms observed by me in the field the majority have their special season, or seasons; and in a few cases it was remarkable how nearly to date the earliest observed examples appeared in the different years.

Taking a few examples from Mussoorie:—

*Aporia soracte*. 1910. Specimens in fresh condition taken on May 10.

1912. The earliest example was observed by me on

May 6.

1913. do. do. do. May 4.

*Euaspa milionea*, was on the wing from 22nd May for about six weeks.

A six weeks total period of flight for a brood seems to be common for many different forms which do not hibernate as butterflies.

*Auloceera padma*, "May" to June 26.

" *brahminus*, "July" (not met with by me in the field).

" *saraswati*, August 27th to October 10th, or later.

" *swaha*, September 5th to October 10th, or later.

From notes of captures in freshly emerged state, and the accompanying seasonal chart, one can draw conclusions as follow regarding the broods of these forms for the district of Mussoorie:

*Callerebia annada*, } both double brooded.

" *hybrida*

*Lethe dyrta* (*rohria* Fabr.) Three broods.

" *confusa*, probably the same, 2 broods at least.

" *insana*,

" *verma*,

" *vaivarta*,

*Neope yama*, one brood.

" *pulaha*, two broods.

In the South of India where the difference between the seasons is less marked, the tendency for forms to breed all the year round may be marked; but I think that such observations as the above for the Mussoorie district show that this is not applicable throughout India.

Incidentally the chart and captures of specimens in freshly emerged condition would seem to prove that *C. annada* and *C. hybrida* are distinct and not merely seasonal varieties of one form as given in most works on the subject, for they fly together, and I have not taken any examples truly intermediate between them.

H. D. PEILE.

22nd January 1914.

(For Chart, see next page.)



## MISCELLANEOUS NOTES.

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*Seasonal Chart of some Butterflies at Mussoorie, showing periods of flight.*

Species.	April.	May.	June.	July.	August.	September.	October.
Callerebia annada ..	26	6 25	5 10 16	4 16 26	31	5 14 24	5 15
" hybrida ..	.....	.....	.....	.....	.....	.....	.....
" scanda ..	.....	.....	.....	.....	.....	.....	.....
" nirmala ..	.....	.....	.....	.....	.....	.....	.....
" hyagriva ..	.....	.....	.....	.....	.....	.....	.....
Lethe dyrta ..	.....	.....	.....	.....	.....	.....	.....
" confusa ..	.....	.....	.....	.....	.....	.....	.....
" insana ..	.....	.....	.....	.....	.....	.....	.....
" verma ..	.....	.....	.....	.....	.....	.....	.....
" vaivarta ..	.....	.....	.....	.....	.....	.....	.....
Neope yama ..	.....	.....	.....	.....	.....	.....	.....
" pulaha ..	.....	.....	.....	.....	.....	.....	.....



No. XXX.—*OPPELLE TENUILOBATAE* (?) IN CUTCH.

In his work on "The Fauna of the Spiti Shales" (Pal. Ind. Ser. xv., vol. iv.) on page 38, Dr. V. Uhlig remarks "We should gain a clearer insight into this matter if a larger number of *Tenuilobata* happened to be known from the Katrol group of Cutch. Unfortunately, one species alone has been so far described from that group, namely, *Oppelia plicodiscus*, Waag." &c.

In the Katrol beds I have found several specimens or fragments of specimens of *Tenuilobata* (as I judge them to be) which are not *Oppelia plicodiscus*. I have placed several in our Museum, and I cannot at the present moment describe them, but I believe that there are more than two species. I have now in front of me a rather worn half specimen of one species, whose suture is brilliantly clear and is, I may say, identical with the suture of *Oppelia indopicta* as given in Fig. iii of Plate III in Uhlig's work. But though the suture seems so exact and the transverse section seems to me the same, the ornamentation somewhat differs. Another specimen with identical suture was recently found by Major R. S. Pottinger, a perfect gem, though it consists of the earlier stages only. This is in the Museum. My specimen too has no extant body chamber. The measurements of the two appear to me to be these.

	Spec. No. 1.	No. 2.
Diameter.. ..	37 mm.	78
Umbil Diam .. ..	3	6 (?) blocked.
Height of whorl .. ..	21	48
Height of whorl from preced- ing periphery.. ..	11	20
Maximum breadth .. ..	9	19.

I will not vouch for absolute accuracy, but the figures are near enough. The widest part is about the middle of the whorl.

In *Indopicta* there are 8 broad low costæ: in this specimen before me I count 10 on the half whorl only. In *Indopicta* the costæ die away somewhere about the middle of the sides: in mine they run half way down the side, and then kink slightly backwards and die off beyond half way. In horizontal light a sort of faint ridge is seen running above the middle of the whorl through the ends of these ribs. Beyond this ridge is a smooth zone out of which rise imperceptibly numerous faint rounded ribs which climb up to the siphonal edge; among these numerous intercelary costæ, the main ribs reappear again, narrower than before but clearly more prominent than the intercelaries. In horizontal light these seem faintly continuous with the main ribs across the smooth zone, the backward band having righted itself again.

As I don't profess to be giving a scientific delineation of this species, I will not say more. I hope I have indicated enough to inform any expert who may be interested that Cutch can still provide material which may be useful in helping to clear up some of the many Ammonite problems. The coarse katrol sandstone plays havoc with many of its entombed relics. Some kinds in places are excellently preserved where there is more iron clay—especially *Perisphinctes*: but *Hybonote aspidoceras* and *Oppelia* are not often found in really good condition.

Of other probable *Tenuilobates*, one kind is much like the above but the main ribs end off in low flat tubercles. Another kind has an extremely narrow and graceful first Lateral Lobe. Of this the Museum has an admirable specimen—the only one I have found. But the former kinds are so not-uncommon that I am surprised that none were provided for Dr. Waagen's study.

BHUJ, 26th September 1913.

J. H. SMITH.



No. XXXI.—*HOLCOSTEPHANUS*? IN CUTCH.

I should like to mention a rare find in the Athleta beds of the Fakirwadi Ridge near Bhuj—a find which I believe will be of no small interest to Palaeontologists. From studying Dr. Uhlig's description of *Holcostephanus* (Pal. Ind. Ser. xv., Vol. iv) I do not think I am far wrong in believing my find to be of or related to that family, unless it should be a morphological equivalent in some other series. *Holcostephanus* has not been reported from Cutch, but the Spiti shales hold plenty: any connecting link between the Spiti shale fauna and those of Cutch needs very close examination. Not having found any one in India who has the leisure or expert knowledge to deal with the matter, I venture to write this, hoping that it may catch the eye of some one who would care to examine the specimen. My description does not pretend to be fully scientific.

I make out the measurements of the specimen to be:—Diam: 65 mm.; Umbil. diam: 22; Height from umbil.: 26; Height from preceding periphery: 19 (?); Breadth across spines: 25 (?). The specimen is badly worn, the existing aperture especially so, but I believe it is not crushed. The inner whorls have been corroded by the soft clay of the Athleta beds: possibly a very careful handling might reveal some of the inner whorls, but I hesitate to try this myself: for the specimen is a rarity: during my constant exploration of these beds for over 3 years, I have only found this one specimen of this species. Now, as to its similarities to *Holcostephanus*, I give the following notes:—

Transverse section of outer whorl—very like Dr. Uhlig's figure of *Holcostephanus spitiensis* (Pl. viii, fig. i b). The preceding whorl is extremely depressed—very much broader than high—as agrees with the same figure and description. The specimen broke in washing and showed this very clearly. Row of spines along umbilical edge—12 in number, it seems, to the whorl. Dr. Uhlig's has more. In *Spitiensis* the edge is rounded: in mine it is acute, nor does it slope down to the umbilicus but falls sheer. But there is another point which seems to militate strongly against identity: viz., the fact that the spines do not seem to be tubercles raised on the ribs and directed in the rib-direction but are fairly round with an appearance of being pinched if at all contrary to the rib-direction; and they are absolutely on the umbilical edge not a bit above it. The ribs are low and rounded, and start out of the narrow level space which skirts the outer side of the row of spines: they number some four to each spine, as far as discernible. They are directed slightly but distinctly forwards and cross the siphonal in a bend, keeping the same thickness and height as on the outer part of the side. Yet again there is another fact in favour of the connection with *Holc. spitiensis*, viz., that the increase of height in the later part of the last whorl seems to coincide with a narrowing of the body chamber as Dr. Uhlig tells us of *spitiensis*. The very rapid development from a low depressed beginning of the whorl to a high conical end in a specimen so small cannot escape one's notice here. The transverse width of the earlier part of the last whorl seems greater than that of the later part. The spines being a good deal worn one cannot give the precise measurements.

The lobes are not visible. I hesitate to try to work them out, for the specimen already broken and cracked may fall to pieces.

I hope these few notes will attract expert attention to what I believe justifies the title of this letter. I have never seen a *Holcostephanus*: but the similarity of my specimen to that figured and described by Dr. Uhlig makes me suspect a possible connection; and my specimen is quite



unlike any other species which I have as yet found in Cutch or has been recorded by Dr. Waagen.

J. H. SMITH.

BHUJ, 27th September 1913.

No. XXXII.—STRAY NOTES ON OLD INDIAN NATURAL HISTORY AND SPORTING PERIODICALS.

I think it may be of interest to recall some of the earlier publications in India which dealt with Sporting and Natural History subjects. The earliest in my possession is the Oriental Sporting Magazine which was published in Bombay in June 1828 and continued quarterly till June 1833. The Bengal Sporting Magazine was issued at Calcutta in March 1833 monthly at a subscription of Rs. 16 per annum raised to Rs. 20 in 1837 when its title was altered to the Bengal Sporting and General Magazine. It ceased to exist in 1846. The Calcutta Journal of Natural History, the first journal of the kind established in India, was published quarterly in 1840 or 1841 and consists of seven volumes and two numbers of the 8th volume; it ended in February 1848. The India Sporting Review began in March 1845, the last volume I have is the fourteenth in 1851; it was published quarterly. There are, no doubt, other publications of a similar character but I do not have them. The Oriental Sporting Magazine was republished in two volumes by Henry S. King & Co. in 1873 and is easily procured. This magazine in its first number contains the immortal song of "The next grey Boar we see" sung either to the tune "My love is like the Red Red Rose" or "My Highland home where tempests blow." It was written by Captain Thomas D'Arcy Morris who appears to have been the principal contributor to this magazine. He did not always sign his effusions, but when he did he (as my father who knew him informed me) signed S. Y. S., these being the last letters of his three names. Morris's forte was parody and many of his pigsticking songs are parodies of Moore, *e.g.*, Tales of the Tuskers which enshrines "The Boar of Rarah Borah" is a parody on "the Loves of the angels." "Oh think not our spear blades are always as bright" a parody on "oh think not our spirits are always as light" and "the spear that once o'er Deccan Dust" a parody on "The Harp that once thro' Tara's Halls" to mention only some of them.

Captain Morris also wrote "Saddle, spur and spear" and many other songs which bear the signature S. Y. S., besides contributing several amusing prose papers. He seems to have been of the opinion of his own verse "Oh, who would change one hour of sport for a thousand hours with none." Major Morris, as he then was, died in 1835 from illness contracted in the campaign against the Bheels in Mahee Kanta. He was Quartermaster General of the Bombay Army. Pigs appear to have been numerous in the Bombay Presidency at this date. The Deal Table riders as mentioned in the Tales of the Tuskers were a detachment from the Poona Union Hunt established in 1815 and consisted of four members legs, as they were called, of the table who derived their title from the circumstance of their taking no furniture with them except a common deal plank which served them as a dresser and dining table. The names of three of them were Jeffries, Davis and Malet. I have forgotten the name of the fourth.

The huntsman mentioned in the Boar of Rarah Borah was Jeffries. The members of the Nagger Hunt used in those days 80 years and more ago to dine together in pink. I still possess the evening swallow tail coat of my father made of scarlet mohair with black velvet collar and cuffs. The buttons are brass showing in relief a galloping boar with a broken spear in his back surrounded by the legend "The Boar the mighty Boar".



The song in the third number of the Oriental Sporting Magazine "In that blest land of freedom from whence we all came" was written by a Col. Sheeldham. The initials H. W. R. to some papers on Hog Hunting are those of Harry Reeves of the Bombay Civil Service. He was afterwards a member of the Bombay Council and died about 1862. According to these accounts sows used to be speared as well as boars, though in Bengal such a proceeding was punished by a fine. I find the following rules were in force in 1835 in Bengal:—

Rule 1st.—Any person spearing a sow wilfully except in self defence to forfeit two dozen claret to the party and to ride no more that day.

2nd.—Any person spearing a sow accidentally to forfeit one dozen claret to the party.

3rd.—Whoever sees the boar first to give the Tally-ho before starting after him.

4th.—No person to pass another who is within spearing distance of the boar and waiting for the charge but to lay behind him and take his turn should the boar jink.

5th.—No one to spear a boar until he charges except close to jungle and there is a chance of the boar getting away if you do not.

6th.—Any person taking first spear is to remain with the boar till killed or disabled under penalty of losing his claims to the tusks.

7th.—When a sounder breaks covert not more than two persons to ride the same boar.

8th.—No person allowed to throw his spear on any pretence.

With reference to the last rule it appears from a book published in 1827, Sketches of Indian Field Sports, that throwing the spear (the Bengal one) was not only once allowed but enforced in fact, it is stated, it is not fair to job or spear the hog without quitting hold of the spear and full instructions are given with illustrations how to hold and throw the spear. The author of this book, Daniel Johnson, states in the preface that he left India in 1809, so his account of hog hunting refers to a period before that date. Captain Williamson in his Oriental Field Sports published early in the last century also mentions throwing the spear as the ordinary mode of attacking a boar, stabbing as he calls it, only being resorted to when throwing was not practicable.

The Calcutta Journal of Natural History was conducted very much on the lines of our own Journal. I find from it that the Thaming, Thamin or Eld's deer, *Cervus eldi*, was first discovered in 1838 in Manipur by Lieut. Eld, Assistant Commissioner of Assam, although it was first brought to the notice of the world by Capt. Guthrie. There are also excellent articles in this journal on the Bear *Ursus labatus* and *Ursus isabellinus*, on the Afghan wild-sheep and goats, on the Thibet wild-ass and wolf, on the Indian wild-dog and the four-horned antelopes which, I think, our journal should reprint, as the Calcutta Journal of Natural History is not easily got. Most of these articles are illustrated with curious lithographic prints of the animals or their horns and there is a very interesting note on the skeletons of the wild-dog, the pariah-dog and the jackall (sic). In the India Sporting Review, 1849, there are figured a pair of shed sambar horns which weighed 25 lbs., an extraordinary weight. I have a thick single shed horn, 41 inches long and 8 inches thinnest part of the beam, which weighs 7 lbs. 13 oz. and the horns of one I shot with a small piece of the frontal bone weighs 19 lbs. The latter is figured in our journal, vol. 17, p. 24. The right horn of the pair that weighed 25 lbs. has each upper tine bifurcated, the left horn has the outer tine bifurcated. They measure 10½ inches immediately about (? above) the burr and 8 inches midway up the brain and are 42 inches in length. They are stated to have been obtained



from a batch of horns collected somewhere on the Cuttack coast or further south towards Madras. Two pairs of Black buck horns,  $25\frac{1}{2}$  and  $24\frac{1}{2}$  inches long, are stated to weigh 1 lb. 4 oz. and 1 lb. 11 oz., respectively. In the 6th vol. (1847) a description is given of a hybrid between a female jackal and Scotch terrier. It was a male and gathered two litters, the mothers being smooth English terriers. The 2nd cross being therefore one-quarter jackal and three-quarters dog, a female of this last lot was put to a Scotch terrier and had five pups who were one-eighth jackal and seven-eighths dog. The quarter jackal (2nd cross) and the half jackal No. 1 also bred, the result being 3 pups, five-eighths dog and three-eighths jackal. The writer also describes a cross between a female wolf and a pointer dog. He also mentions that he was informed that the Rampore Greyhound was crossed with the wild-dog, the offspring being called "Lall be bao" or "Priceless Red" which would grapple with a bear or hyæna.

This Journal in vol. 5 has a map of the Bombay Race Course as it existed in 1847.

J. D. INVERARITY.

BOMBAY, 28th January 1914.



## PROCEEDINGS

## OF THE MEETING HELD ON 6TH NOVEMBER 1913.

An 'At Home' of members and their friends of the Bombay Natural History Society took place on Thursday, the 6th November 1913, Lt.-Col. W. E. Jennings, I.M.S., presiding.

## NEW MEMBERS.

The election of the following 27 members since the last meeting was announced:—Capt. E. O. Lewin, R.F.A., Jubbulpore; the Principal, Ernaculam College, Cochin State; Mr. M. V. H. Collins, Simla; Mr. G. B. Walker, Hyderabad, Deccan; H. E. the Nawab Salar Jung, Hyderabad, Deccan; Mr. A. T. C. Sutton, Nizamabad; the Librarian, Imperial Library, Calcutta; Capt. A. Mactavish, Fatehgarh, U.P.; Mr. T. E. Tunnard, Ceylon; Mr. E. J. Bunbury, Bombay; Mr. C. H. E. Wilson, Vimramga; Mr. C. K. Hargreaves, Toungoo; Mr. H. D. Baskerville, I.C.S., Larkana; Mr. R. D. Thomson, I.C.S., Sialkot; Capt. E. C. Smith, Miranshah; Mr. H. Tessman, Andheri; Dr. D. N. P. Datta, M.D., Punjab; Capt. M. L. C. Irvine, I.M.S., Ahmedabad; Mr. E. B. Burke, Assam; Mr. N. J. Strachan, Travancore; Capt. W. J. Fraser, I.M.S., Chindwara; Lt.-Col. D. L. MacEwen, Bangalore; Mr. F. R. Roe, I.C.S., Patna; Lt. O. B. Foster, Ambala; Dr. J. J. F. Dunn, Mussoorie; Mr. J. G. Wakefield, Gaya, Bengal; Capt. J. F. Turner, R. E., Gilgit.

The Honorary Secretary acknowledged the following contributions to the Museum since the last meeting:—

Contribution.	Locality.	Donor.
Skins of Brow-antlered Deer ( <i>Cervus eldi</i> ) and 3 skulls and one skin of Burmese Goral ( <i>Nemorhedus griseus</i> ), Binturong ( <i>Arctictis binturong</i> ), Hog Badger ( <i>Arctonyx collaris</i> ), Panther skull ( <i>Felis pardus</i> ) and 4 Butterflies.	Paletwa, Arrakan.	Mr. W. S. Thom.
Skins and skulls of 2 Common Mongooses ( <i>Mungos mungo</i> ), 3 small Indian Civets ( <i>Viverricula malaccensis</i> ), 2 Jackals ( <i>Canis indicus</i> ), 1 Indian Wolf ( <i>Canis pallipes</i> ), 2 Wild Pigs ( <i>Sus cristatus</i> ), 1 Lungur Skin ( <i>Prestyitis entellus</i> ).	Saran, Bihar ..	Mr. M. M. Mackenzie.
2 Oorial Heads ( <i>Ovis vignei</i> ) ..	Lower Sind Hills.	H. S. Lawrence, I.C.S.
Mutjac skin ( <i>Muntiacus vaginalis</i> ), 6 skins of Wroughton's Freetailed Bat ( <i>Otomops wroughtoni</i> ) 29 Birds and a number of insects.	Talewadi ..	Mr. S. H. Prater.
A small collection of Rats ..	Ootacamund ..	Surgeon-General W. B. Bannerman.



Contribution.	Locality.	Donor.
1 Large Red Flying Squirrel ( <i>Petaurista inornatus</i> ).	Chitral .. ..	Capt. H. F. Stirling.
Eggs of Stilt ( <i>Himantopus candidus</i> ), Crested Grebe ( <i>Podiceps cristatus</i> ), Little Grebe ( <i>Podiceps albipennis</i> ) and Kentish Plover ( <i>Egialitis alexandrina</i> ).	Quetta .. ..	Mr. A. B. Atken.
5 Shrews .. .. .	Goa .. .. .	Mr. N. A. Baptista.
2 Blood Pheasants ( <i>Ithagene sp.</i> ) 2 Selaters Monals ( <i>Lophophorus sclateri</i> ) and 1 Temmincks Tragopan ( <i>Tragopan temmincki</i> ).	Hypinaw, Burma	Mr. H. C. Lewis.
1 Short-tailed Tropic Bird ( <i>Phaethon indicus</i> ).	Persian Gulf ..	Sir P. Cox.
1 Yellow-legged Herring Gull ( <i>Larus cachinnans</i> ).	Chitral .. ..	Major Money.
2 Horned Owls ( <i>Bubo</i> ) ..	Ahmedabad ..	Mr. R. H. Heath.
17 Snakes .. .. .	Pyawbwe ..	Capt. F. E. W. Venning.
Several Snakes .. ..	Larkana and Dhulia.	Capt. Gharpurey.
8 Land Crabs .. .. .	Chamba .. ..	H. H. The Raja of Chamba.

Minor contributions from Lt.-Col. Wodehouse, Major Carlton, Drs. Suter and Bayley de Castro and Messrs. C. Rodgers, W. S. Thom, D. Remedios, M. Hussein, F. H. Sprott, C. H. Wilson, H. S. Northey, Wise, H. M. Dwane, and Lunatic Asylum, Poona.

An 'At Home' of members and their friends of the Bombay Natural History Society took place on the 12th January 1914.

The election of the following 42 members since the last meeting was announced:—Mr. H. Garbett, P. O. Barahapjan, District Lakhimpur; Mr. A. C. Armstrong, Yeotmal, Berar; Mr. G. S. Hill, Balangoda, Ceylon; Mr. A. E. Zolinger, Amraoti Camp, Berar; Col. T. J. R. Lucas, C. B., Bangalore; Mr. H. L. Shuttleworth, I.C.S., M.A., F.R.G.S., Hoshiarpur, Punjab; Capt. S. Sarkar, I.M.S., Bombay; Mr. R. D. Scoble, Hodgins, Travancore; Capt. J. D. Venables, Mandalay, Burma; Mr. R. H. Young, Karachi; Dr. H. Dannehl, Bombay; Mr. A. L. French, Karachi; Lt. H. R. Wilson, Shillong; Mr. W. S. Hamilton, I.C.S., Lahore; Mr. G. B. H. Fell, C.I.E., I.C.S., Rangoon; Mr. J. M. D. Mackenzie, I.F.S., Kindat, Burma; Mr. J. W. Edden, Shillong, Assam; Mr. K. R. Rane, M.M. S.P., Juvem, via Andheri; Capt. H. R. Hadow, Loralai; Capt. J. Knowles, Bareilly; Mr. E. F. Abraham, I.C.S., Jhelum; Lt. H. M. Heyder, Ambala; Mr. J. W. Powell, Bombay; Mr. Y. G. Nadgir, M.S., Bombay; The Professor of Biology, Canning College, Lucknow; Mr. M. S. Advani, C.S., Surat; Mr. A. R. S. Hayne, Bombay; Capt. J. Anderson,



Papun, Burma; Mr. H. D. Baker, Bombay; Mr. R. Forshaw, Bombay; Dr. V. P. DeSa, L.M. & S., Goa; Mr. Julius Graf, Dadar, Bombay; Mr. F. Anderson, Papun, Burma; Lt. H. F. Francis, R.G.A., Rangoon; Mr. Y. K. Rane, Juven, Andheri; Major Frederic Harvey, R.A.M.C., Colaba, Bombay; Mrs. D. W. Wilson, Bombay; Mr. J. G. Dobbs, P. O. Hutti, via Raichur; Mr. H. Emblen, Cachar; Capt. J. F. Graham, I.M.S., Jhelum; Mr. R. H. Bullen, Corgaum, and Mr. E. F. A. Graham, I.C.S., Punjab.

The Honorary Secretary acknowledged the following contributions to the Museum since the last meeting:—

Contribution.	Locality.	Donor.
6 Brow-antlered Deer ( <i>Cervus eldii</i> ), 1 Gaur head ( <i>Bibos gaurus</i> ), 1 Tsaing ( <i>Bibos sondaicus</i> ), 1 Buffalo head ( <i>Bubalis bubalis</i> ), 158 Bird skins.	Burma .. ..	Mr. J. P. Cook.
3 Heads of Marcopolo's sheep ( <i>Ovis poli</i> ).	Pamirs .. ..	Capt. R. W. G. Hingston, I.M.S.
1 Markhor ( <i>Capra falconeri</i> ) ..	Gilgit .. ..	Do.
1 Suleman Markhor ( <i>Capra falconeri jerdoni</i> ).	Tochi Agency ..	Capt. H. T. C. Ivens.
1 Bengal Monkey skin ( <i>Simia rhesus</i> ), 1 Langur skull ( <i>Presbytis schistaceus</i> ), 3 small Mammals, 6 Snakes, 6 Toads.	Simla .. ..	Mr. P. T. L. Dods-worth.
1 Tree Shrew ( <i>Tupaia wrough-toni</i> ).	Khandalla .. ..	Dr. M. F. Suter.
5 Mammals and several Birds' skins.	Tibet .. ..	Capt. F. M. Bailey.
Golden Cat ( <i>Felis temmincki</i> ) ..	Upper Burma ..	Mr F. Atley.
10 Birds' skins .. ..	Mishmi Country ..	Capt. F. M. Bailey.
Young Bar-headed Goose ( <i>Anser indicus</i> ).	Chitral .. ..	Major E. D. Money.
Swinhoe's Snipe ( <i>Gallinago megala</i> ).	Burma .. ..	Mr. C. Gwyer.
Wigeon (pale variety) ( <i>Mareca penelope</i> ).	Roorkee .. ..	R. G. Bagnell.
Painted spur Fowl ( <i>Galloperdix lunulata</i> ), Indian Otter ( <i>Lutra nair</i> ), and 3 Wild Dog ( <i>Cuon dukhunensis</i> ) skins.	Chikalda Disritet.	Mr. A. A. Dunbar Brander.
White-winged Wood Duck ( <i>Asarcornis scutulatus</i> ).	Burma .. ..	Mr. E. Jackson.
1 Laughing Gull ( <i>Larus redembundus</i> ), 1 Brown-headed Gull ( <i>Larus brunicephalus</i> ), 1 Gull Billed Tern ( <i>Sterna anglica</i> ).	Bombay .. ..	Mr. S. H. Prater.
2 Snakes ( <i>Zamenis diadema</i> ), 1 Chameleon ( <i>Chamelecon calcaratus</i> ) (alive).	Ajmere .. ..	Mr. W. Shipp.
30 Beetles .. ..	Burma .. ..	Mr. J. H. Lace, I.F.S.



Minor contributions from—Messrs. R. W. L. Dunlop, C. H. Wilson, E. C. Reid, J. M. Cairns, A. M. D'Crus, P. F. Gomes, G. Claridge, H. H. M. Spink, G. C. Shortridge, Dr. Bailey de Castro and Lt.-Col. G. H. Evans.

Mr. C. D. Mahaluxmivalla, Superintendent, Victoria Gardens, Bombay, exhibited the flowers of three kinds of Silk Cotton trees—the common red *Bombax malabaricum*, the white *Eriodendron anfractuosum* and the yellow flowered *Cochlospermum gossypium*; two *Dombeyas*, the white flowered *Mastersii* and the pink *acutangula*; the red-flowered *Kalanchoe kirkii* and the yellow *spathulata*.

#### MAMMAL SURVEY.

The specimens exhibited numbering about 1,500, were collected by Messrs. Crump and Shortridge in Kumaon and Burma respectively, including many species not previously obtained by the Survey. The primates in the collections were represented by Macaques, probably of the same or very nearly related species from both countries, Langurs, the common Himalayan form from Kumaon and another species not yet determined from Burma and one Gibbon from the last-named country.

Of the smaller Cats there were Jungle Cats and single examples from each country of the beautiful little Leopard Cat, which, though widely distributed, is very local and not well known. From a former collection there were specimens from Coorg; and some years ago the Society presented two kittens from Castle Rock to the Victoria Gardens.

One skin of the small Indian Civet and a nice series of the Malayan Palm Civet, all from Burma, and two common Mongooses from Kumaon represented the Viverridae or Civets and Mongooses. Of the Canidae there was a skin of the Indian Wild Dog from Kumaon and one of the Malayan form from Burma, and several mountain and common Indian Foxes from the former country. The Malayan Wild Dog, which is found in parts of Burma, is a much paler animal than its Indian cousin, and it was interesting to compare the two. Though Martens are found in Burma, none have been obtained by the survey so far; but from Kumaon several skins of the common form have been sent in, as well as two beautiful little yellow-bellied Weasels, which are about the size of the English stoat. One of the most interesting specimens in the collection on exhibition was the Burmese Ferretbadger, of which four specimens were obtained at Mount Popa, south of Mandalay. This animal, which is well described by its trivial name, is about the size of a large mongoose, but shorter in the body, of a greyish-brown colour with a prominent white stripe on the head and shoulders. Very little is known of the habits of this animal. From each district an Otter was sent in, apparently of different species, a point which will be decided when the collection is worked out.

#### SHREWS AND BATS.

The Insectivora were represented by tree shrews, shrews and bats. Of the first-named a nice series of the Yunnan species from Burma. This little animal is frequently mistaken for a squirrel, but in India proper, there is no reason for this, as all the small squirrels are striped, and the tree shrew, has no stripes but is grizzled. In Burma, however, there are several squirrels, brown or greyish all over, very similarly coloured to the tree shrews and they are harder to distinguish. One species is not uncommon at Matheran and Khandalla and on the Madras side while another race is found in the Dangs, and still another in Orissa and parts of the C. P. The species found in the N. E. of India is probably the same as that found in parts of Burma and Assam.

Shrews were well represented from Kumaon, and both Collectors had sent in a tiny specimen each of what is probably the smallest Indian Mammal.



Of bats there were a good set of the common yellow bat from Kumaon and a large number of different species from Burma, amongst which might be mentioned the Indian Vampire and the small fruit bat. As is generally the case, the collections are strongest in rodents. There are Burmese hares ranging from very young animals to adults, common Indian hares or a species very similar from Kumaon, Bengal Porcupines from Burma and a large number of rats and mice. Of these probably the curious Bamboo Rat with its large incisor teeth attracted the most attention.

Squirrels are well represented from Burma, and apart from the flying squirrels of which there are three kinds, probably the bay squirrel, which is of a beautiful rich ferruginous red colour called for most notice. A Sambar and a Goral from Kumaon and a Mouse Deer and Muntjac from Burma represent the Game Animals in the collection, while the two beautiful skins of the Chinese Pangolin or Ant-eater interested many people more than any of the other species.

The presence of Miss K. C. Ryley, at the "At Home" added to the success of it, as Miss Ryley has been working at the British Museum (Natural History) for the last 18 months on the specimens which have been sent home by the Society in connection with the Mammal Survey. Miss Ryley is now visiting India and China on a holiday, but it is hoped that she will be able to resume her work at the British Museum later on. Fortunately for the Society, Mr. R. C. Wroughton returns from South Africa in May and will take up the Mammal Survey work at the British Museum once more.

A meeting of members and their friends of the Bombay Natural History Society took place on the 19th February 1914, Lt-Col. W. E. Jennings, I.M.S., presiding.

The election of the following 21 members since the last meeting was announced:—Mr. E. E. English, Bombay; Mr. G. W. Talbot, Bombay; Commander H. Kitson, R. N., East Indies Squadron; Mr. V. Wilcox, Ireland; Mr. W. Evans, Bombay; Mr. W. C. Shepherd, Toungoo, Burma; Miss A. Mac Ivaine, New Jersey; Mr. B. C. Rowlandson, Bombay; Major C. Gregory, Ootacamund; Mrs. A. D. Barr, Jodhpur; Capt. A. L. M. Molesworth, Shillong; Miss Olivia da Cunha, Bombay; Mr. S. A. H. Sitwell, Bombay; Lt. E. A. W. Lake, Poona; Mr. W. G. Wooster, Monywa; Mr. A. MacWilliam, Barisal, Eastern Bengal; Mr. A. B. Ritchie, Rangoon; Mr. Herbert A. Eltoft, Bombay; Mr. G. H. White, Bombay; Mr. R. R. Oakley, Ceylon; H. E. Lord Willingdon, G.C.I.E., Bombay.

#### ELECTION OF THE COMMITTEE.

The following gentlemen were elected as office-bearers for the present year:—President, H. E. the Right Hon. Lord Willingdon, G.C.I.E.; Vice-Presidents, Mr. J. D. Inverarity, B.A., LL.B., Revd. F. Dreckmann, S. J., and the Hon. Mr. Justice N. C. Macleod; Managing Committee:—Revd. J. Assmuth, S.J., Mr. T. Bainbrigg Fletcher, F.E.S., Mr. T. R. Bell, I.F.S., Mr. C. L. Burns, Mr. E. Comber, F.Z.S., Lt.-Col. G. H. Evans, C.I.E., F.L.S., Capt. W. H. Evans, R. E., Prof. G. A. Gammie, Mr. F. Hannyngton, I.C.S., Mr. G. S. Hardy, I.C.S., Mr. N. B. Kinneir, Lt.-Col. K. R. Kirtikar, I.M.S. (Retd.), Major W. G. Liston, C.I.E., I.M.S., Mr. J. McNeill, I.C.S., Mr. F. M. Mackwood, Dr. A. Powell, Mr. E. L. Sale, I.C.S., Mr. R. A. Spence, Major F. Wall, I.M.S., C.M.Z.S., Mr. John Wallace, C.E.

Honorary Secretary, Mr. W. S. Millard, Honorary Treasurer, Mr. L. S. Savile.



The Honorary Secretary acknowledged the following specimens since the last meeting :—

Contribution.	Locality.	Donor.
Skin of Striped Weasel ( <i>Mustela strigidorsa</i> .)	Arrakan .. ..	Mr. W. S. Thom.
4 Bird skins .. ..	Karara .. ..	Col. H. Delme Radcliffe.
Herring Gull ( <i>Larus fuscus</i> ) ..	Karachi .. ..	Mr. T. M. S. Culbertson.
2 Woodsnipe ( <i>Gallinago nemoricola</i> ), 1 Solitary Snipe ( <i>Gallinago solitaria</i> ), 1 Pintail Snipe ( <i>Gallinago stenura</i> ), 6 Snakes.	Tounggyi, Burma.	Mr. S. St. Lightfoot.
Ringed Plover ( <i>Egialitis dubia</i> )	Colaba, Bombay.	Mr. S. H. Prater.
Cobra ( <i>Naia tripudians</i> ) ..	Chin Hills .. ..	Capt. W. Massey.
Tibetan Wolf Skin ( <i>Canis laniger</i> )	Chitral .. ..	Capt. H. F. Stirling.
Jackal skin ( <i>Canis indicus</i> ) ..	Hazaribagh .. ..	Major O. A. Smith.
Several Sea Snakes, Fish, Fossils, Slides of Snails' teeth.	Persian Gulf .. ..	Capt. F. W. Townsend.
Burmese Civet ( <i>Viverra megaspila</i> ).	Tounggyi, Burma.	Mr. S. St. Lightfoot.
Large Indian Civet ( <i>Viverra zibetha</i> ).	Siam .. ..	Mr. J. F. Keddie.
Skin and Skull of female Sambar.	Duars .. ..	Mr. W. P. Field.
1 Smew ( <i>Mergus albellus</i> ) ..	Sind .. ..	H. E. Lord Willingdon.
1 Whisting Teal (variety— <i>Querquedula javanica</i> ).	Markali, Assam.	Mr. E. P. Burke.
65 Butterflies .. ..	Various. .. ..	Mr. F. M. Mackwood.
1 Jungle Cat ( <i>Felis affinis</i> ) 2 Rooks ( <i>Corvus frugilegus</i> ), 1 Jackdaw ( <i>Coloeus monedula</i> ), 4 other Birds.	Jhelum .. ..	Mr. H. Whistler.

Minor contributions from Messrs. W. R. LeG. Jacob and H. M. Dwane.

#### THE ACCOUNTS FOR 1913.

Mr. L. H. Savile, the Honorary Treasurer, said in presenting the accounts for the year ending 31st December 1913:—The opening balance at the beginning of the year was Rs. 3,120-6-0, the closing balance being Rs. 2,198-3-10 showing a deficit on the year's working of Rs. 922-2-2.

The expenditure during the year amounted to Rs. 36,684, which is Rs. 755 less than last year. The receipts however only amounted to Rs. 35,763, which is Rs. 1,256 less than 1912.

The total amount received by subscription, including arrears and those paid in advance for 1914 and 1915, amounted to Rs. 24,142. The subscriptions paid for the present year, including those paid in 1912, (and allowing, say Rs. 1,000 still to come in) amounts to Rs. 24,040, which gives the



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number of subscribing members at, say, 1,600, besides which we have 106 Life Members.

The number of new members who joined during 1913 was 143 as against 195 in 1912, which is a serious falling off.

The cost of printing and issuing the Journal during the current year amounted to about Rs. 25,000, so that, as pointed out last year, the subscription received from members does not cover the actual cost of the Journal.

As pointed out earlier, the year's working has shown an excess of expenditure over income of close on Rs. 1,000; and unless our membership can be further increased, the question of increased subscriptions will have to be considered, as it is unlikely that the expenses can be cut down without impairing the value of the work now being done by the Society.

#### MAMMAL SURVEY FUND.

The opening balance of this fund was Rs. 15,517, while the closing balance is Rs. 14,848, an excess of expenditure over receipts of Rs. 669.

During the year Rs. 25,344 was received in donations to which, adding interest on money invested, made the total receipts for the year amount to Rs. 25,934. The expenditure during the year amounted to Rs. 26,603 which is nearly double that of last year, but we have now three Collectors at work on this Survey, namely, Mr. C. A. Crump, Mr. G. C. Shortridge and Major E. W. Mayor, working in India, Burma and Ceylon, and I think the reports that have appeared from time to time in the Journal, giving an account of the work accomplished, fully justifies this expenditure and it is hoped that sufficient further donations will be forthcoming to enable the Society to complete this important undertaking.

#### THE MAMMAL SURVEY.

Mr. Crump is collecting near Philibhit, U. P. on the S. W. border of Nepal and is shortly proceeding to Behar and Orissa and Bengal.

Mr. Shortridge is doing well in Lower Tonasserim, and the first batch of his specimens will be arriving shortly.

Major Mayor is now in the hilly parts of Ceylon completing the Survey of this Island.

As regards finances, a very welcome contribution has been received from the Bombay Government in the shape of a grant of Rs. 10,000 towards the Survey and Rs. 2,500 has just been received for the same object from the Central Provinces Government.

#### EXHIBITS.

The Superintendent of the Victoria Gardens exhibited specimens of the following flowering trees:—*Erythrina herbacea*, *Erythrina parcelli*, *Gliricidia maculata*, *Bauhinia heterophylla*, *Millettia microstachya* and *Cesalpinia mexicana*.

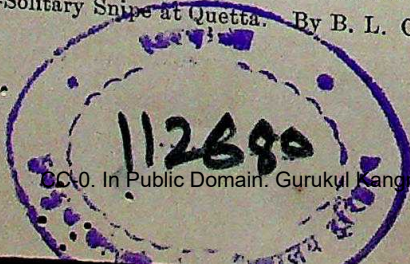
#### PAPER READ.

Some field notes on a collecting trip for Termites (White Ants) in Behar and Orissa was read by the Rev. J. Assmuth, S. J.



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